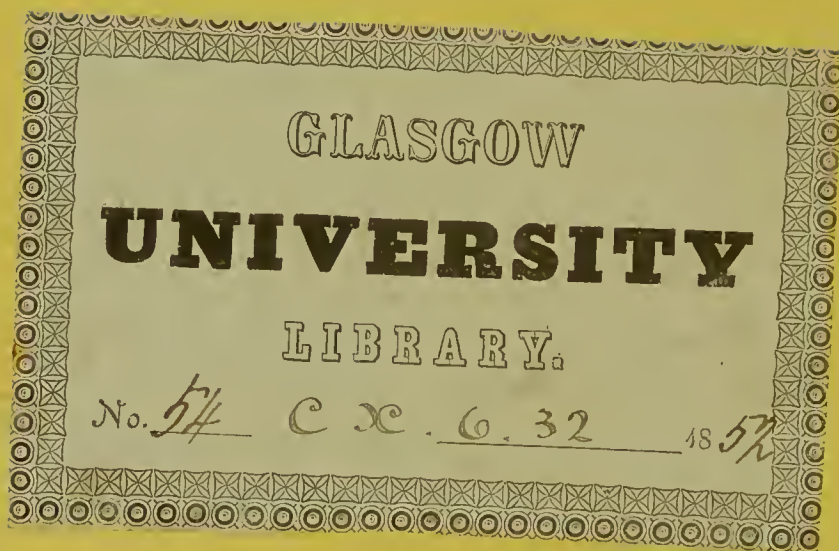




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A  
DESCRIPTIVE CATALOGUE  
OF THE  
ANATOMICAL MUSEUM  
OF  
St. Bartholomew's Hospital.

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PUBLISHED BY ORDER OF THE GOVERNORS.

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VOL. II.

CONTAINING THE DESCRIPTIONS OF THE SPECIMENS OF NATURAL AND  
CONGENITALLY MALFORMED STRUCTURES,  
AND LISTS OF THE MODELS, CASTS, DRAWINGS, AND DIAGRAMS.

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## PREFACE.

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IN the twenty years that have elapsed since the publication of the former Catalogue, the physiological portion of the Museum, to the description of which this Volume is chiefly devoted, has become doubly numerous.

During the same time, the collections of Microscopic Specimens, and the Drawings and Diagrams, have been added to the Museum.

So large an increase of the Collection seemed to make it expedient that all the corresponding parts of the Catalogue should be re-written. This has, accordingly, been done: and the opportunity has been taken to describe nearly all the specimens more fully than they are described in the former Catalogue. Some changes also have been made in the arrangement of the Collection; the chief of these being that the Specimens of Human and Comparative Anatomy are placed together, and that the general order of the Series is conformed to that adopted in the Museum of the Royal College of Surgeons.

JAMES PAGET.





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### ADDITIONS AND CORRECTIONS.

- In Vol. i. p. 12, l. 10; *for* 108 *read* 11.  
 p. 160, l. 16; *for* 76 *read* 16.  
 p. 248, l. 6, from the bottom; *for* 113 *read* 114.  
 p. 283, No. 8, is probably a specimen of 'capillary phlebitis' in the lung.  
 p. 370, No. 21, is an example of the effects of chronic tuberculous laryngitis.  
 p. 442, l. 5; *for* 5 *read* 111.
- In Vol. ii. p. 37, 38, the descriptions of the Tongue and other Organs of the Ostrich (No. 7) and of the Tortoise (No. 10) are transposed.

## SERIES I.

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### NATURAL CONSTITUENT COMPOUNDS, OR PROXIMATE PRINCIPLES, OF ANIMAL SUBSTANCES.

1. 1. Olein, or Elain, from fat.
1. 2. Stearin, from fat.
1. 3. Cholestearin, from human biliary calculi, in the form of white, transparent, and glistening lamellæ.
1. 4. Sugar of Milk, or Lactin, from Cows' Milk, in powder and in masses of minute crystals.
1. 5. Parts of two large cylindriform masses of crystallized Sugar of Milk.
1. 6. Impure Sugar, from diabetic urine, in irregular crystalline lumps and coarse powder, of pale brown colour.  
Presented by Dr. Ormerod.
1. 7. Urea, from human urine, crystallized in long, clear, white, four-sided prisms.
1. 8. Uric or Lithic Acid, from the mixed urine and fæces of the Boa Constrictor, in white imperfectly crystalline powder.
1. 9. Casein, or Caseum, from Cow's Milk, in thin transparent pellicles, or pieces of membrane, like shavings of horn.



1. 10. Hæmatin, or Hæmatosin, from human blood, in small, hard, and nearly black lumps.

The preceding specimens, with the exception of Nos. 5 and 6, were prepared and presented by Thomas Taylor, Esq.

1. 11. Impure Fibrin; one specimen, in a thick, firm, and compact layer, probably from a "buffy coat" of inflammatory blood; the other, in irregular strings and small lumps, obtained probably by stirring blood before it coagulated.

1. 12. Dried impure Fibrin.

1. 13. Dried impure Albumen.

1. 14. Impure hydrated peroxyde of Iron, from blood.

## SERIES II.

### THE BLOOD, AND OTHER COMPONENT FLUIDS OF THE BODY.

2. 1. A Clot of Blood, in the formation of which the red corpuscles sank below the surface before the fibrine coagulated. A layer of fibrine has thus coagulated on the surface of the clot, without any admixture of red particles, forming a white or "buffy" coat on the top of the dark clot. The contraction of this portion of the coagulated fibrine, not being hindered, as that in the dark part of the clot was, by red corpuscles imbedded in it, its margins are drawn towards its centre, puckered, and incurved, giving a "cupped" appearance to the clot.

2. 2. Similar Clots of "buffed and cupped" Blood : a section of one of them displays the thickness and almost pure whiteness of the buffy coat.
  2. 3. A layer of Fibrin, or Buffy Coat, removed from the surface of a clot of blood, such as is shown in the preceding specimens.
  2. 4. A mass of Fibrin, split into thin membranous layers and filaments.
  2. 5. A colourless branched Clot of Blood, withdrawn from the pulmonary artery and its ramifications. In the slow coagulation of the blood after death, the red particles had time to subside to the posterior branches of the pulmonary artery, leaving the other constituents of the blood to form this pale coagulum in the upper and anterior branches.
  2. 6. Serum, which in the recent state had a milky appearance, from the minutely divided fatty matter mingled with it.
  2. 7. Ashes of burnt blood. They are spotted with peroxyde of iron.
  2. 8. Oil from Human Fat ; a mixture of Olein and Margarin.
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### SERIES III.

#### THE CELLULAR, FIBRO-CELLULAR, AREOLAR, OR CONNECTIVE TISSUE.

3. 1. Two portions of Cellular Tissue, from the scrotum, inflated and dried. The air impelled into the tissue has separated the bundles and lamellæ of its component filaments, so that

they form a kind of cells or spaces, communicating with each other, and of various size and shape.

3. 2. Fibro-cellular Tissue, in the form of membrane, from the Peritonæum. The membrane is formed by the interweaving of bundles of the component filaments of the tissue.
3. 3. A similar specimen, extended and in some measure unravelled, so as to show more plainly the irregularity of size and direction in the fasciculi of which it is composed.
3. 4. A portion of Peritonæum, dried after the minute injection of its blood-vessels. The arrangement of the principal vessels is arborescent, with widely diverging branches, and numerous anastomoses. Each artery appears associated with a vein.
3. 5. A portion of Pleura, similarly prepared, and exhibiting a similar arrangement of its blood-vessels.

The two preceding specimens were prepared by Professor Scarpa, and given by him to Dr. Burrows, by whom they were presented to the Museum.

## SERIES IV.

### THE FIBROUS, OR TENDINOUS, TISSUE.

4. 1. A Tendo Achillis, with its parallel component fasciculi of tendinous fibres spread out and a little separated.
4. 2. A Tendo Achillis, of which the component fasciculi are more completely separated. The margins of several of the fasciculi are flocculent with the cellular tissue by which they were connected to those adjacent to them.
4. 3. Tendons of the extensor muscles of the fingers dried after the

injection of their blood-vessels. The principal vessels within the tendons run in long parallel lines in the cellular tissue between the fasciculi, and communicate by short transverse branches. The arborescent vessels apparent on the surfaces of the tendons belong to the cellular tissue with which, as with sheaths, the several tendons were invested.

4. 4. One of the flexor tendons of the fore-leg of a Calf, exhibiting, more perfectly than the preceding specimen, the arrangement of the long parallel blood-vessels in the interfascicular cellular tissue, and their transverse communicating branches.

The specimen is described by Mr. Paget in a paper "On the blood-vessels of Tendinous tissues" in the London Medical Gazette, vol. 24, p. 562.

4. 5. Part of a Tendon, from a Horse, dried after the minute injection of its blood-vessels with mercury. Longitudinal vessels are shown like those in the preceding specimens; but the vessels here principally shown are the arborescent arteries and veins of the cellular tissue investing the tendons. These form an intricate network, and every artery appears to be accompanied by two veins.

Prepared and presented by Thomas Wormald, Esq.

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## SERIES V.

### THE MUSCULAR TISSUE.

5. 1. The lower half of the Biceps Muscle of an Arm, with its fasciculi separated by the removal of the cellular tissue by which they were invested and mutually connected.

5. 2. Part of a Semi-tendinosus Muscle dried after a fine injection of its blood-vessels. The principal vessels are shown running parallel to the muscular fibres. One vessel of large size extends along the boundary between the muscle and the tendon.

## SERIES VI.

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### THE CARTILAGINOUS AND OSSEOUS TISSUES.

Composition of bone, 2 to 12.

General structure of bone, 13 to 18.

Blood-vessels of bone, 19 to 25.

Varieties of bone, 26 to 30.

Process of ossification and growth of bones, 31 to 47.

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6. 1. PART of a Rib including portions of both its bone and its cartilage. The continuity of the periosteum and perichondrium, their common investing membrane, is shown.
6. 2. Two Ribs from which salts of lime and other bases were removed by solution in dilute hydrochloric acid. The remaining animal substance, mingled with the substances insoluble in the hydrochloric acid, retains the original form and size of the bones, but is so soft and flexible, that it has been tied in knots without breaking.
6. 3. Portion of a Rib from an Egyptian mummy. It was immersed, like the preceding specimen, in dilute hydrochloric acid, and the usual proportion of animal matter remains, preserving the original size and shape both of the bone itself and of a quantity of new bone formed in the repair of a fracture.
6. 4. The animal matter of several child's bones, retaining their form and size after the removal of their saline constituents.



6. 5. Portions of Bones which were boiled for several hours in a solution of potash. The animal matter of the bones was thus dissolved ; but its earthy and saline matter remains, preserving the original form and size of the bones, but of chalky whiteness, brittle, and easily separated in lamellæ, or rubbed into powder.
6. 6. The earthy and saline portion of part of a Tibia prepared in the same manner as the preceding specimens.
6. 7. Portions of several Bones after the removal of their animal matter by calcination. Their shape and apparent texture are not altered by the process.
6. 8. A mass of Sulphate of Lime, precipitated on the addition of sulphuric acid to the solution of chloride of calcium and phosphate of lime obtained by the immersion of bones in dilute hydrochloric acid.
6. 9. Portion of a Fibula, after immersion in sulphuric acid. It is very little softened ; and the sulphate of lime, by which the decomposed carbonate is replaced, is deposited in small lumps on the surface of the bone.
6. 10. Portions of the cartilages of a Foetal Skeleton which were boiled for many hours on each of several successive days. They were little changed : and no gelatine was obtained from them.
6. 11. The Skull of a young Pig, to which madder was given with its food for a considerable time before death. The surfaces of all the bones have a bright red colour, derived from the madder which combined with the phosphate of lime deposited in the growing bones during its administration.
6. 12. A similar specimen dried. The tinge of colour is less deep in this than in the preceding skull ; and the centres of the surfaces of the parietal, squamous, and superior maxillary bones are white, probably because the ossification of these parts was complete before madder was mixed with the food, and it is



chiefly or only that phosphate of lime which is deposited while the colouring matter is in the blood that receives its tinge.

6. 13. Section of a Femur, to display the general arrangement of the textures of a large bone. The cortical layer of compact substance forms, as a wall of various thickness, the whole outer part of the bone, and incloses the medullary, or cancellous tissue. The osseous lamellæ and fibres of the cancellous tissue are seen variously arranged in the different parts of the articular ends of the bone, and on the walls of the medullary tube or cavity in the middle of the shaft.
6. 14. Section of the lower part of a Femur displaying the arrangement of its cancelli, and that the chief of them are in the form of delicate fibres and lamellæ, running vertically down to the articular surface, and slightly converging towards its centre. In the middle of the cancellous tissue, above the articular portion of the bone, the fibres are very delicate; and most of them are placed across the axis of the bone, as for the support of the medullary adipose tissue.
6. 15. Transverse section of the upper part of a Tibia, displaying the construction of its cancellous tissue, the principal lamellæ of which, though much interrupted, are arranged in vertical planes, with their borders directed to the front and back parts of the bone. Within the tubercle of the tibia, the cancellous tissue is very close, and its lamellæ thick and strong.
6. 16. Section of a Patella, showing the uniform, finely areolar construction of its cancellous tissue, and its thin wall of compact tissue, arranged according to the general plan of structure of round or spongy bones.
6. 16. A. Part of a Femur, in which, after the removal of its earthy salts by solution in acid, the outer part of the wall has been separated in thin layers. The deeper substance of the wall has also been more coarsely split into layers and fibres, of which the principal direction is parallel with the axis of the shaft.

6. 17. Portion of an Humerus. After long immersion in dilute hydrochloric acid, a part of the walls of the shaft has been split into bundles of coarse interlacing fibres, the chief of which are parallel to the axis of the shaft.
6. 18. Portion of a Fibula, similarly dissected into layers and bundles of fibres.
6. 19. Section of an Os Calcis, dried after the minute injection of its blood-vessels.
6. 20. Section of the lower part of a Tibia, similarly prepared.
6. 21. Section of a Tibia, the vessels in all parts of which have been partially injected through the medullary artery.
6. 22. Section of a Tibia, in which vessels have been injected in the medullary tissue as well as in the walls, through the arteries derived from the periosteum.
- The anastomoses through which, in these instances, the injection passed, are in the inner layers of the walls of the bone, between the arteries which they derive from the periosteal arteries without, and from the medullary or great nutritive artery within.
6. 23. Section of a Tibia, dried and put in turpentine, after the injection of its medullary artery, and the removal of its earthy matter by solution in dilute hydrochloric acid. The trunk of the medullary artery passes very obliquely through the posterior wall of the bone, from above downwards, and extends along the axis of the medullary tissue into the lower third of the bone. In its course it gives-off many branches, which supply the medullary tissue and the inner part of the wall. Its principal branch is given-off shortly beyond its entrance into the medullary tissue, and, after passing downwards for a short distance, takes a recurrent course, and supplies the upper part of the shaft of the tibia.
6. 24. The lower part of a Tibia, from which a portion of the walls has been removed, to exhibit the branchings of the injected medullary artery.

6. 25. The upper part of a Skull, from which the outer table is removed to show the large osseous canals for veins ramifying in the diploe. The walls of the canals are painted blue.
6. 26. Section of the upper part of a Human Femur, for illustration of the general characters of the bones of the limbs of Mammalia. It is distinguished from the following by the thickness, hardness, and close texture of its walls, and by the existence of delicate cancellous tissue within the walls at and near the articular end, and of a medullary tube in its shaft, which tube, like the spaces in the cancellous tissue, was, in the recent state, filled with fat or marrow.
6. 26. A. Section of the upper part of the Femur of a Woman seventy-three years old. It shows, as the usual degeneration of old age, the comparative thinness and defective hardness of the walls, the wider spaces in the cancellous tissue, and the larger quantity of fatty matter not removable by maceration.
6. 27. Sections of the Femur of an Ostrich (*Struthio Camelus*) displaying, as its chief characteristics, thinness but extreme hardness of walls, and a very large medullary tube traversed with hollow bony beams and plates which supported the membranes of air-cells. The air-cells within the bone communicated with the lungs by apertures (*foramina pneumatica*) near the proximal articular end of the bone.
6. 28. Sections of the Humerus of a Swan (*Cygnus Olor*), showing the same general characters.
6. 29. Sections of the Femur of a Turtle (*Chelonia Mydas*). Its walls are thin, except at the middle of the shaft where is the principal curvature of the bone; within the walls nearly the whole of the bone consists of a very close cancellous tissue, the spaces in which contained medulla.
6. 30. Sections of the Coracoid Bone of a Turbot (*Rhombus maxi-*

mus). It displays, as characteristics of the bones of fish, lightness and whiteness of its general texture, and a laminated and fasciculate appearance of its surface, with little diversity of internal construction.

6. 31. The vertebral column of a Foetus about four months old. In the centre of the body of each vertebra is an opaque spot, or a small mass of yellowish cancellous bone, indicating the commencement of ossification. The process is furthest advanced in the lower dorsal and the upper lumbar vertebræ; proceeding from these, both upwards and downwards, its progress in the successive vertebræ appears gradually less.
6. 32. The Vertebral Column and Pelvis of a Child about a year old. It shows the further advanced ossification of the bodies of the vertebræ, and the nearly completed ossification of the laminæ, transverse and articular processes, and pedicles. The parts which remain cartilaginous, and thus constitute the epiphyses of the vertebræ, are, the spinous processes, the extremities of the transverse processes, and the anterior roots of the transverse processes of the cervical vertebræ. The anterior half of the ring of the atlas also contains only a small central portion of bone.
6. 33. The Sternum of a Foetus about seven months old. One portion of bone occupies the centre of its upper piece; three portions of smaller size are placed irregularly in the second or middle piece.
6. 34. The Sternum of a Foetus about eight months old, exhibiting the further progress of the ossification from several centres, the beginning of which is shown in the preceding preparation.
6. 35. The Sternum of a Child less than a year old. In the further progress of the ossification, two new portions of bone, or centres of ossification, have been formed in the inferior angles of the upper piece of the sternum; and there are six



portions in the middle piece, of which the two upper are placed in the middle line, and the four lower symmetrically on each side of it. Besides these, several very small portions of bone are irregularly placed in the cartilage.

6. 36. The Sternum of a Child about three years old, exhibiting one large disk-shaped mass of bone in the upper, and five, of various sizes, in the middle piece. These are all symmetrically formed, and placed one above the other across the middle line.

The series of specimens, while they display a general uniformity in the process of ossification, show that, in different instances, there is some diversity in the plan according to which it is accomplished in the sternum.

6. 37. Bones of the Pelvis of a Child about three years old. In the os innominatum it will be seen that the crest of the ilium, the tuberosity of the ischium, the symphytic part of the os pubis, and portions of cartilage between each two of these bones, remain unossified. In the sacrum, the spinous processes, and portions of cartilage between the bodies of the vertebræ and their transverse processes, and at the extremities of the latter, are in the same state. The bone already formed is not completely covered with compact tissue: parts of it, especially on the ilium, present a porous surface with close-set minute apertures and fine short grooves.

6. 38. The Femur, Tibia, and Fibula of a Fœtus, dissected so as to show that the cartilaginous and partly ossified tissue of their walls may be split into longitudinal fibres.

6. 39. The parietal and frontal Bones of a Fœtus displaying the arrangement of the first-formed bone, in fibres radiating from the centre of ossification, and connected by short transverse and oblique intermediate bands.

6. 40. The parietal Bones of an older Fœtus. The radiating fibres of bone are seen, especially at the edges, projecting in a pectinate manner: the central parts of the bones have become, in the further progress of ossification, thicker and

more compact, but the appearance of radiating fibres may be observed on their surfaces.

6. 41. A Fœtal Parietal Bone, in which the Blood-vessels are injected. The principal vessels lie parallel to the radiating osseous fibres.
6. 42. Sections of the Femur of a Fœtus eight months old. The walls and medullary tissue of the shaft are ossified and well-formed. The epiphyses are entirely cartilaginous; they include, at the upper end of the bone, the head, neck, and great trochanter; at the lower end, the condyles and the trochlea.
6. 43. Section of the Femur of a young Child, the Blood-vessels of which are injected. In the shaft, the vessels appear very numerous and uniformly distributed through the medullary tissue. In the epiphyses, especially in the lower one, vessels are shown running in canals from the circumference towards the centre; but wide apart, so that the colour of the cartilage is scarcely altered by the injection. In the centre of the epiphysis the small portion of bone already formed appears bright red from the abundant supply of vessels ramifying in it.
6. 44. Sections of a Femur displaying the same facts.
6. 45. Section of the lower part of the Femur of a Child about ten years old. The ossifying process has extended through the greater part of the epiphysis; and the same contrast is shown between the vascularity of the central portion of bone, and the apparent bloodlessness of the remaining cartilage.
6. 46. Numerous Bones from a Fœtus nine months old. Bristles are introduced into the canals in the walls of the bones through which blood-vessels passed. These canals are in several of the bones more numerous than in after-life. For example, the femur, which in the adult has but two canals for the medullary or nutritive arteries, is here shown with



four canals in one limb, and two in the other: the tibia also has four on one side and two on the other; in one scapula four canals are shown, in the other five.

6. 47. Several Bones of young Dogs and young Pigeons, after a series of experiments to determine the mode in which growing bones increase in length. Needle-points were introduced at measured distances into different parts of the bones a certain number of days before the animal was killed. After death, by measuring, in each case, the distances between the needle-points, and between each of them and the ends of the bone, it could be ascertained whether the bone had grown in length between the points, or beyond them. The result of the experiments showed that the bones increased in length by addition to their extremities, especially their distal extremities; and that, when any part of the walls of a bone in a young animal is thoroughly hardened by ossification, it ceases to increase in length.

## SERIES VII.

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### THE TEETH.

General composition and structure, 1 to 4.  
Productive organs and development, 5 to 15.  
Wasting and growth, 16 to 21.  
Adaptation of bones, 22 to 28.  
Succession, 29 to 36.  
Comparative anatomy, 37 to 57.

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7. 1. Sections of an Incisor and a Molar Tooth, showing the disposition of their component structures ; the ivory or dentine surrounding the pulp-cavity, and forming the greater part of the tooth ; the enamel covering the dentine of the crown ; and the bone covering the dentine of the fang.
7. 2. Sections of Teeth after maceration in dilute hydrochloric acid. The greater part of the saline and earthy constituents of the teeth having been decomposed or dissolved in the acid, their animal matter remains, preserving their natural form and size, but soft and pliant. The animal matter consists principally of gelatine.
7. 3. Sections of Burnt Teeth. The dentine is almost completely blackened by the charring of the animal matter it contains ; but the enamel, containing an exceedingly small portion of animal matter, is only tinged with yellow. In some of the specimens the dentine is more completely blackened near the

pulp-cavity than near the outer surface of the teeth; as if indicating that the animal matter is most abundant in the former situation, where, also, the dentine tubes are largest.

7. 4. Sections of a Molar Tooth of a Horse similarly burnt and displaying similar appearances. The bone is not so black as the dentine; perhaps because its animal matter is more completely burnt.
7. 5. Portions of the Lower Jaw of a mature Fœtus, from which the outer wall is removed so as to show the outer surfaces and general forms of the capsules of the teeth.
7. 6. A similar specimen displaying the capsules of the Teeth in the upper jaw.
7. 7. The Upper Jaw of a Fœtus from which parts of the anterior wall are removed, together with the anterior walls of the capsules of the teeth. In the cavities of the capsules thus laid open, the rudiments of the teeth are shown, on the right side, consisting of caps of dentine and enamel like the crowns of the deciduous teeth without fangs. On the left side, the caps of dentine are removed from the pulps, to the surfaces of which they were exactly adapted. The pulps, presenting the forms of the crowns of the several teeth, are connected with the bases, or deepest parts of the capsules; their blood-vessels are imperfectly injected.
7. 8. A similar preparation of a Lower Jaw; showing, on the right side, the rudimental teeth; and, on the left, the teeth-pulps.
7. 9. Sections of an Intermaxillary Bone removed in an operation for hare-lip. The section has passed through the capsule and rudiment of a tooth of the second set. The lower section displays part of the tooth turned off its pulp. In the upper section bristles are placed between the pulp and the substance of the tooth, in which is visible, besides the layers of dentine and enamel, the thin layer of bone with which the enamel of the crown is covered for some time after its protrusion.

7. 10. The right half of the Lower Jaw of a foetal Calf, with the capsules of the teeth displayed by the removal of the inner wall of the bone.
7. 11. The capsules of two Molar Teeth from a foetal Calf, laid open, so as to show the rudiments of the teeth and part of their connexion with the pulps.
7. 12. A Molar Tooth of the second set, the crown of which is completely formed. A portion of the capsule is preserved, to show that, when the formation of enamel is complete, the capsule becomes a thin, tough membrane, much less vascular than it was before.
7. 13. A set of rudimental Teeth from the left side of the jaws of a mature foetus.
7. 14. A set of specimens to show the development of a Canine Tooth ; including (1) the formation of a thin cap of dentine ; (2) the enlargement of this, till it acquires the size, and then the thickness, of the complete crown of dentine ; (3) the gradual coating of the crown with enamel ; and (4) the growth of the fang.
7. 15. A similar set of specimens, to show the development of a Molar Tooth.
7. 16. A set of Teeth, showing the effects of mastication. The surfaces of their crowns are slightly concave, and bordered with a narrow, sharp-edged layer of enamel. The rest of the enamel and the greater part of the original dentine of the crown is worn away, but the pulp cavity is not opened, because, while the exterior of the dentine was being removed, new matter was added to its interior. The new dentine, thus formed in the part of the pulp enclosed within the crown of the tooth, is of yellow colour, and does not possess the perfect minute structure of the original dentine. It has received the name of Osteo-dentine, to indicate that its structure combines those proper to bone and dentine.

7. 17. Sections of the Head of a Rat, with its incisor teeth. The cavities in which these teeth are set are shown. They are very deep, extending in the upper jaw to the wall of the orbit, and in the lower jaw to the base of the coronoid process. Each cavity is filled with the fang of a tooth, and at its bottom has a vascular pulp, in which the growth of the tooth constantly goes on. The growth, by constantly protruding the tooth, compensates for the continual waste of substance which it undergoes in the rodent mode of mastication. Enamel, of a yellowish colour, is placed on the anterior surface of the tooth, and forms its cutting edge.
7. 18. Sections of the Lower Jaw of a Beaver, showing similar incisor teeth, and their cavities extending under the fangs of the molar teeth.
7. 19. The Skull of a Rabbit, from which the superior incisor teeth were removed. The inferior incisors, being no longer subject to attrition, and continuing to be protruded by the additional substance added from their pulps, have gained a length of more than an inch.
7. 19 A. The Lower Jaw of a Rabbit, in which a similar outgrowth of one of the incisor teeth has occurred in consequence of a deformity of the jaw after an ill-repaired fracture.
7. 20. The left half of the Lower Jaw of a Rat, in which, as in the preceding specimens, the incisor tooth has acquired an unnatural length, and is recurved so as to form a nearly complete circle.
7. 21. Sections of a Canine Tooth from an old Lion. The pulp-cavity is closed, and crystals of phosphate of lime are deposited on its walls.
7. 22. Foetal Jaw-bones, showing, between the anterior and posterior walls of their alveolar portions, the grooves for the lodgment of the capsules of the teeth. In the anterior half of each jaw, the groove is divided by partitions into distinct rudimentary



mental sockets or alveoli ; in the posterior half the divisions are not yet formed.

7. 23. Jaw-bones from an older foetus, with the alveoli more completely formed.
7. 24. Jaw-bones of a Child, with the alveoli similarly shown. One large cavity, undivided by partitions, exists in each half of the lower jaw for the capsules of the permanent true molar teeth.
7. 25. A Lower Jaw, with the outer wall removed to display the alveoli of the teeth, the canals for the trunks of the inferior dental nerves and vessels, and the minuter canals for their branches passing to the apices of the alveoli.
7. 26. Lower Jaw of an aged Person, exhibiting changes consequent on the loss of the teeth. The alveoli of the incisors, canines, and first molars, remain ; all the rest have disappeared by the absorption of the alveolar part of the jaw, whose upper margin is slightly hollowed out, and marked with a line of minute apertures in the situation of the former alveoli. The angle of the jaw is more obtuse than is natural.
7. 27. A similar specimen, with more complete absorption of the alveolar portion of the jaw, and greater obtuseness of its angle. The whole jaw-bone is very small and slender, but the dental and mental foramina are large.
7. 28. A Lower Jaw, exhibiting the same changes in a yet more advanced degree. The last molar tooth on the right side alone remains, but nearly the whole length of its fangs is exposed by the absorption of the alveolar part of the jaw. Similar absorption on the left side has much reduced the depth of the alveolus of the corresponding tooth. The angle of the jaw can scarcely be discerned : the posterior border of the ascending ramus is continued with a nearly uniform curve into the lower border of the body of the jaw.



7. 29. Portion of an Upper Jaw, displaying part of the process for the replacement of a temporary by a permanent incisor tooth. The temporary incisor, with its fang nearly absorbed and its alveolus filled up, is connected with the jaw only by the attachment of the gum around its neck. Immediately above it is the osseous capsule, containing the permanent incisor. The section has passed through this tooth and its capsule, and displays in the tooth the pulp-cavity, the crown fully formed, the rudimental fang, and the successive layers of dentine, enamel, and bone forming the crown. The layer of bone, through which the permanent tooth would have to pass in being protruded, is about half a line thick.
7. 30. The right half of the Upper Jaw of a Child. The temporary incisor and first molar teeth are completely protruded. The capsule of the temporary canine tooth is obscurely shown from behind: that of the second temporary molar is completely exposed, but not turned downwards. The capsules of the permanent incisor and canine teeth are removed from their cavities and turned down, remaining attached by only the slender cords, or gubernacula, which connect them with the gum behind the necks of the corresponding temporary teeth. The capsule of the first permanent molar is shown *in situ*; and part of the very small cavity for the capsule of the first permanent premolar or bicuspid.
7. 31. A similar preparation, showing the corresponding parts in the left half of the Lower Jaw of, probably, the same Child. Here also the capsule of one of the premolar teeth is shown. The capsules of the permanent incisors are of nearly equal size, while in the preceding upper jaw the capsule of the first permanent incisor is fully four times as large as that of the second.
7. 32. The left half of the Lower Jaw of a Child. All the deciduous teeth are protruded. The capsules of the permanent incisors are laid open and collapsed: that of the permanent canine is suspended by its gubernaculum; that of

the first permanent molar is opened, and the rudimental tooth exposed within it.

7. 33. The Jaws of a Child, probably about six years old, with a complete set of deciduous teeth, and the capsules and rudiments of all the permanent teeth. Bristles are passed from the capsules of the permanent teeth through small foramina in the margin of the alveolar border of the jaw just behind the necks of the deciduous teeth. These foramina, the remains of the communications which existed between the capsules of the several teeth of the deciduous and permanent sets, indicate the parts through which the permanent teeth would be protruded, and the attachments of their several gubernacula.
7. 34. The Jaws of a Child of about the same age as the preceding. The same relations of the two sets of teeth are here shown from behind, which, in the preceding specimen, are displayed from the front.
7. 35. The Jaws of a Child, probably about seven years old. The rudiments of all the permanent teeth are larger, and their fangs more nearly complete, than in the preceding specimens. The first permanent incisors and the first permanent molars are protruded in both jaws; the apices of the fangs of the second temporary incisor and second temporary molar on the right side of the lower jaw.
7. 26. The Jaws of a Child, probably about ten years old. There are twelve teeth set-out in each jaw; the ten belonging to the deciduous set, and the two first molars of the permanent set. All of them are perfect and well-formed.
7. 37. Human Jaw Bones, with a complete set of teeth, the last molars having been in process of protrusion. The chief essential characters of the human teeth are, (1) their number, thirty-two, comprising in each half of each jaw two incisors, one canine, two bicuspid or premolars, and three molars; (2) the equality in the length of the crowns of them all, so that the points of all in each jaw are nearly in one plane; (3)

the equal closeness of all the crowns, and especially the absence of a space between the upper lateral incisor and the upper canine tooth ; (4) the conical form and obtuseness of the canine teeth ; (5) the nearly vertical direction of the crowns, especially of those of the incisors. (Compare 39.)

7. 38. A complete set of Adult Human Teeth, in sections showing their external shapes and their cavities.
7. 39. The Skull of a Monkey (*Cercopithecus Sabæus*), with a perfect set of teeth, at the same period of nearly completed dentition as those in the human jaws, No. 37.
7. 39 A. Skull of a small insectivorous Bat (*Vespertilio Pipistrella*), showing the numerous sharp spinous prominences on the edges of its molar teeth.
7. 39 B. The Canine and first Molar Teeth of a Dog (*Canis familiaris*), as characteristics of the dental apparatus of carnivora. The canines present long, sharp-pointed, and slightly recurved, conical crowns, with deep fangs. The first molars (*Dents carnassières*, *Dentes sectorii*) are compressed and sharp-edged, like scissors-blades, with three sharp points or cusps.
7. 40. A Tooth of the Cachalot, or Spermaceti Whale (*Physeter macrocephalus*). See pp. 25-6.
7. 40 A. Whale-Bone ; the horny substitute for teeth in certain of the whales.
7. 41. A Tooth of the *Mastodon giganteus* ; probably the last deciduous molar tooth.
7. 42. A last, or third true Molar Tooth of the *Mastodon giganteus*, with five transverse bifid ridges and a posterior talon.  
Found, with the preceding, at Big-bone Lick, Kentucky.
7. 43. Sections of a Molar Tooth, probably the third, of a young Elephant. The enamel, dentine, and crusta petrosa or cement, are shown in each of its thirteen plates. The

anterior three plates alone are worn by mastication so as to expose the dentine and enamel.

7. 44. Transverse section of the fourth Molar Tooth of an Asiatic Elephant, showing the relations of its component dentine, enamel, and cement.
7. 45. The anterior portions of the Jaws of a Horse, about two years old, with the incisor teeth. The "mark" is shown, formed by a central isolated portion of enamel, which is raised in an oval ridge, surrounded by and enclosing shallow depressions or cavities in the discoloured cement.
7. 46. Transverse sections of the crowns of two Molar Teeth of a Horse, showing the complex and convoluted arrangement of their component structures.
7. 46 A. Skull of a Rat (*Mus decumanus*), showing the chief characteristics of the teeth of such rodents, viz., in each jaw, the long curved chisel-edged incisors, whose mode of growth is described under No. 17; the wide edentulous space between them and the molars, canine teeth being not present; and the transversely ridged three molar teeth on each side.
7. 46 B. The Incisors and several Molar Teeth of a Rabbit (*Lepus Cuniculus*). The principal incisors are essentially like those last described: but behind the superior pair are two rudimentary and of small size. The molar teeth, like the incisors, in this and other entirely herbivorous rodents, present no distinction of crown and fang, but are of uniform size in all their length, and are adapted, like the incisors, for continuous growth.
7. 47. The Head of a large venomous Snake from the Island of St. Lucia, with the poison-glands and fangs displayed. The poison-fang is the first of the series of large curved teeth exposed by the dissection: it is tubular, and the upper end of its tube receives the duct of the poison-gland, which rests on the outer side of the upper jaw.

Presented by Major Gibson.



7. 47 A. The Upper Jaw of a Turtle (*Chelonia Mydas*), with the horny sheath of its lower border, which serves as a substitute for teeth.
7. 48. Jaws and Teeth of a Shark (*Galeus ferox*).
7. 49. Jaws and Teeth of a White Shark (*Carcharias vulgaris*).
7. 50. Jaws and Teeth of a Shark (*Lamna ferox*). In Sharks' jaws the anterior of the several rows of teeth are alone in use. When they are lost or ejected, those in the next posterior row rise from the recumbent position and take their place. The forms of the teeth, it will be observed, are various in different species, and even in the two jaws of the same species.
7. 50 A. Tooth of a Fossil Shark (*Otodus*).
7. 51. The Saw of a Saw-fish, five feet in length (*Pristis antiquorum*).
- Presented by Philip Hurlock, Esq.
7. 52. A young Saw-fish, with its saw, formed of teeth lodged in sockets at the sides of its peculiar elongated rostral cartilages.
7. 53. Jaws and Teeth of a Dog-fish (*Mustelus lævis*).
7. 54. Jaws and Teeth of a Skate (*Raia Batis*).
7. 55. Head of a Pike (*Esox Lucius*), displaying the crowds of slender conical teeth in the intermaxillary, premandibular, palatine, vomerine, lingual, branchial, and pharyngeal bones.
7. 56. Head of a Perch (*Perca fluviatilis*), with similar crowds of teeth, all small and close-set like pile of velvet; teeth "en velours."
7. 57. Sections of the Mouth and Mandibles of a Calamary (*Loligo*

vulgaris). The mandibles are broad horny plates, with sharp, curved, median processes, which, in closing, pass each other like those of the parrot's beak, except in that the lower passes in front of the upper one. Their bases are fixed in the thick muscular walls of the mouth.

Numerous other illustrations of the Teeth of Vertebrata will be found in the Twenty-eighth Series. The following pages, containing an abstract of Professor Owen's General Observations on the Teeth of Mammalia, Reptiles, and Fishes<sup>1</sup>, may serve as a guide to their study :—

### TEETH OF MAMMALIA.

The class Mammalia includes a few species which are entirely devoid of teeth ; such are the Ant-Eaters, and the Echidna (Series 28. 252). A few Mammals have the jaws provided with horny substitutes for teeth, as the Whalebone Whales (Series 7. 40 A), and the Ornithorynchus (Series 28. 253). In the rest of the class true teeth are present.

The number of teeth, thirty-two, which characterizes Man (Series 7. 37), the Apes of the old world (Series 7. 39), and the true Ruminants (Series 28. 230-1, &c.), is the average number in the class Mammalia. Examples of the smallest numbers are found in the Hyperoodon and Narwhal, which have each only two teeth. The Elephant (Series 28. 190-1) has one entire molar or parts of two, on each side of the upper and lower jaws, and two tusks in the intermaxillary bones. On the other hand, examples of the largest numbers are presented in the Cetacea by the Cachalot, which has upwards of sixty teeth ; by the common Porpoise (Series 28. 176), which has between eighty and ninety teeth ; and by the true Dolphins (Series 28. 178), which have from one hundred to one hundred and ninety teeth.

Where the teeth of Mammalia are in excessive number, they are all small, equal or nearly equal, and of a simple conical form, as in the Porpoise (Series 28. 176, &c.) and Whale (Series 7. 40). In the

<sup>1</sup> In his "Odontography," pages 1, 179, and 296.



Armadillos, and some species of Sloth, the teeth present differences of size, but little variety of shape. In almost all the other Mammalia, particular teeth have special forms for special uses : thus, the front-teeth, being commonly adapted to effect the first coarse division of the food, have been called cutters or incisors ; and the back-teeth, which complete its comminution, grinders or molars : large conical teeth, situated behind the incisors, and adapted, by being nearer the insertion of the biting muscles, to act with greater force, are called holders, tearers, laniaries, or, more commonly, canine teeth, from being well developed in the dog and other carnivora. But, since these names are not always indicative of the shape or special adaptation of the teeth to which they are applied, it has been necessary to consider the position and the mode of succession of the teeth, in order to their definition and classification. The term "incisor" is now applied to those teeth which are implanted in the intermaxillary bones, and in the corresponding part of the lower jaw. When the tooth which succeeds the incisors, or the first of the upper maxillary bone, is conical, pointed, and longer than the rest, it is called a "canine," as is also its analogue in the lower jaw, which always passes in front of it when the mouth is closed. Of the remaining teeth, those which are shed and replaced vertically, or which have successors descending into their place, in the upper, and ascending in the lower jaw, are called "premolars," or "false molars," and, in human anatomy, "bicuspidæ;" the remaining teeth, which are not displaced by vertical successors, but which follow each other from behind forwards, in both jaws, are called "molars," or "true molars."

True teeth, implanted in sockets, are confined in this class to the maxillary, intermaxillary, and lower maxillary bones ; and, in general, are situated on all of these.

In the ordinary teeth of Mammalia three points are usually recognized : the fang, or root, which is the inserted part ; the crown, which is the exposed part ; and the neck, the constriction between the crown and fang. It is peculiar to the Mammalia to have teeth implanted in sockets by two or more fangs.

In no mammiferous animal does ankylosis of the tooth with the jaw constitute a normal mode of attachment. Each tooth has its proper socket, to which it firmly adheres by the close co-adaptation of their opposed surfaces, and by the firm adhesion of the alveolar

periosteum to the organized cement which invests the fang or fangs of the tooth.

The teeth of the Mammalia usually consist of hard or unvascular dentine, defended at the crown or exposed portion with an investment of enamel, and every where surrounded with a coat of cement or bone. The cement on the crown is of extreme tenuity in Man, *Quadrumana* and terrestrial *Carnivora* (Series 28. 130, &c.): it is thicker in the *Herbivora*, especially in the complex grinders of the Elephant (Series 7. 43-4), and is thickest in the teeth of the Sloths and *Cachalot*. Vertical folds of enamel and cement penetrate the crown of the tooth in the Ruminants (Series 28. 230, &c.), and in most Rodents (as in Series 28. 235, &c.), and *Pachyderms* (Series 7. 46). The tusks of the Walrus (Series 28. 172), Elephant (Series 28. 191), and others, consist of modified dentine, which in the larger proboscidian animals is properly called ivory, and is covered by cement.

The central part of the fully-formed tooth usually contains an irregular kind of osseous substance, named "osteodentine;" and a peculiar substance, named "vascular dentine," from the number and regular position of the vascular canals in it, forms the body or axis of the teeth in the Sloth tribe, and a smaller proportion in the centre of the teeth of the *Armadillos*.

## TEETH OF REPTILES.

Teeth, properly so called, do not exist in all Reptiles; they are absent in the whole order of *Chelonia*, in the *Coluber scaber* among the *Ophidia*, and in the Toads among the *Batrachia* (Series 28. 304-5); and in the Tortoises and Turtles (Series 28. 285-6) the jaws are covered with sheaths of horn, developed on series of distinct papillæ, which sink into alveolar cavities along the margins of the jaw-bones. These alveoli are indicated by the persistence of vascular canals long after the horny sheath is completed.

The teeth of the dentigerous reptiles are, for the most part, simple, and adapted for seizing and holding, but not for dividing or masticating their food (Series 28. 301-6). With few exceptions, they present a simple conical form, with the crown more or less curved, and the apex more or less acute. Their transverse section is sometimes circular, but more commonly elliptical or oval; the margins of their crowns may be sharp or serrated; their surfaces smooth, or

variously impressed, ridged, or grooved. In some Serpents (as in Series 7. 47), certain teeth in the superior maxillary bones present a longitudinal groove or perforation for conveying a venomous saliva into the wounds which they inflict; these are named "poison fangs."

Teeth may be present on only the jaws of reptiles, as in the Crocodiles and many Lizards (Series 28. 294-5); or upon the jaws and roof of the mouth, and here either upon the pterygoid bones, or upon both palatine and pterygoid bones, as in most Serpents (Series 28. 301); or upon the vomer, as in most Batrachians (Series 28. 306); or upon both vomerine and pterygoid bones, as in the *Proteus* (Series 28. 309); or upon the vomerine and sphenoid bones, as in the *Salamandra glutinosa*.

As a general rule, the teeth of reptiles are anchylosed to the bone which supports them. Such an anchylosis may be effected at the base of the tooth, or by an oblique surface extending from the base more or less upon the outer side of the crown, as in most Lacertian reptiles and in Frogs; or, as in a few species, the teeth may be anchylosed to the margins of the jaws, or upon conical processes of bone. When the teeth continue distinct, they may be lodged either in a continuous groove, or in separate sockets, as in the Crocodilians. (Series 28. 294, &c.)

The substance of the teeth of reptiles may be fourfold, and a single tooth may be composed of dentine, cement, enamel, and bone; but the dentine and cement are present in the teeth of all reptiles. In the Batrachian and Ophidian reptiles a thin layer of cement invests the central body of dentine; a generally thin coat of enamel defends the crown of the tooth in Batrachians and most Saurians, and the last remains of the tooth-pulp are not unfrequently converted into coarse bone.

## TEETH OF FISHES.

The teeth of Fishes, in whatever relation they are considered, whether in regard to number, form, substance, structure, situation, or mode of attachment, offer more various and striking modifications than do those of any other class of animals. Some species of fishes are destitute of teeth: among these are the Sturgeons (*Acipenser*, Series 28. 325). In some, as in the Myxines, a single tooth is developed on the median line of the palate; in the Carp (*Cyprinus*



Carpio, Series 28. 314), which affords an example of the general rule of the paucity of teeth in the cyprinoid fishes, a single dental plate upon the occipital bone is opposed to two or three rows of from one to four teeth, placed on the pharyngeal bones on each side. From these and the like examples of fishes provided with very few teeth, every gradation in number may be traced to those in which, as in the Pike (*Esox Lucius*, Series 7. 55), and others, the mouth and pharynx are crowded with teeth.

The principal forms of the teeth in fishes may be referred to modifications either of the cone, the plate, the prism, or the cylinder.

The teeth of fishes may be situated on the pharyngeal bones exclusively, as in most of the cyprinoid fishes; among which, however, the Carp presents, besides the teeth on the pharyngeal bones, one which is wedged into a cavity of the occipital bone. In the ordinary Sharks and Rays, on the other hand, the teeth are confined to the maxillary cartilages bounding the anterior aperture of the mouth (Series 7. 48—50). The Wrasse (Series 28. 316) is an instance in which the intermaxillary and premandibular, as well as the pharyngeal bones, have teeth. In many fishes, including all those of the Gadoid or Cod tribe (as in Series 28. 318), teeth are present, not only at both the orifices of the mouth, on the intermaxillary, premandibular, branchial, and pharyngeal bones, but also on the vomer. In other fishes, as in the Pike (*Esox Lucius*, Series 7. 55), teeth are placed on all these bones, and, besides, on the palatine, lingual, and hyoid bones; in most of the Salmon tribe, the superior maxillary bones also support teeth; and to these are added, in some fishes, as the Great Sudis and *Glossodus*, teeth upon the lingual, pterygoid, and sphenoid bones.

Teeth are also found among fishes in some anomalous positions; as on the occipital bone of the Carp (Series 28. 314), and on the accessory rostral cartilages, which, being elongated, ossified, and bearing strong teeth set vertically in their sides, form the saw of the Saw-fish (*Pristis*, Series 7. 51-2). In the Lampreys (Series 28. 327) most of the teeth are attached to the lips.

The teeth of fishes present greater diversity in their mode, as well as plan, of attachment, than is observable in those of any other class of animals. In a few instances they are implanted in sockets, to which they are attached only by the surrounding soft parts; as, *e. g.*, the rostral teeth of the Saw-fish (Series 7. 51). Some have

their hollow base supported like the claws of the feline tribe, upon bony prominences, which rise from the base of the socket; but in the more ordinary mode of implantation in sockets there is a slight ankylosis of the base of the fully-formed tooth with the parietes of the alveolar cavity.

But by far the most common mode of attachment of the teeth in fishes is by a continuous ossification between the dental pulp and the jaw, the transition being gradual from the structure of the tooth to that of the bone; the tooth, prior to the completion of the ankylosis, is connected by ligamentous substance, either to a plain surface, an eminence, or a shallow depression in the jaw-bone.

In the Cod-fish (Series 28. 318), and some other species, in proportion as the ossification of the tooth advances towards its base, and along the connecting ligamentous substance, the subjacent portion of the jaw-bone develops a process corresponding in size and form with the solidified base of the tooth. In this case, the inequalities of the opposed surfaces of the tooth and the maxillary dental process fit into each other, and for some time are firmly attached together by a thin layer of ligamentous substance; but, in general, ankylosis takes place to a greater or less extent before the tooth is shed. The various degrees of ligamentous and osseous attachment of teeth may be observed on the several dentigerous bones of the head of the Cod. The broad, and generally bifurcate, osseous base of the teeth of Sharks is attached by ligaments to the ossified or semi-ossified crust of the cartilaginous jaws. (See Series 7. 48—50.) The small, and closely-crowded teeth of the Rays (Series 7. 53) are connected by ligaments to the subjacent maxillary membrane.

The teeth of fishes, in respect to their substance, present various degrees of density and complexity. In most of the Chætodonts they are flexible and elastic, of a yellowish, shining, and subtransparent tissue. In the Cyclostomes, as in the Lamprey (Series 28. 327), they consist of an albuminous horny tissue. The upper pharyngeal molar of the Carp consists of a peculiar brown and semi-transparent tissue, harder than the true horny teeth of the Lamprey. The greater number of fishes have their teeth composed of an osseous substance, somewhat denser than the jaws to which they are affixed. In some instances, the substance of the teeth is uniform and not covered by a layer of a denser texture. In others, as the Shark, &c., the tooth is coated with a dense, shining, enamel-like substance; but



this is not true enamel, nor the product of a distinct organ ; it differs from the body of the tooth only in the greater proportion of the earthy particles, their more minute diffusion through the gelatinous basis, and the more parallel arrangement of the calcigerous tubes ; but it is developed in and by the same matrix, and, resulting from the calcification of its external layer, is the first part of the tooth which is formed. In other fishes, the dentine or proper osseous substance of the tooth is covered with a denser substance or enamel, developed by a distinct organ. In others, the ossification of the capsule of the matrix adds to this enamel a coating of a third substance, analogous to the cæmentum or crusta petrosa of the mammalian teeth : and in the pharyngeal teeth of the Parrot-fish, a fourth substance is added to the structure of the tooth by the coarser ossification of the pulp, after its peripheral portion has been converted into the dense ivory. The teeth, thus consisting of dentine, enamel, cement and coarse bone, are the most complicated as regards their substance that have been yet discovered.

## SERIES VIII.

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### THE MOUTH AND TONGUE.

8. 1. Portion of the walls of a Mouth, displaying the papillary surface and vascularity of the mucous membrane of the lips and cheek.
8. 2. Portion of an Upper Jaw, displaying in the mucous membrane of the hard palate and the gum the same kind of papillæ and the same vascularity as are shown in the preceding specimen.
8. 3. A Tongue, on which, together with its general form and connexions, are shown the several kinds of papillæ. The upper surface of the tongue, its edges, and part of its inferior free surface, are covered with minute, uniform, cylindrical, and conical papillæ, "*papillæ conicæ vel filiformes.*" Near the posterior part of the tongue, in two lines forming an angle with its apex directed backwards, are eight larger bodies, named "*papillæ circumvallatæ.*" Each consists of a circular flattened elevation of the mucous membrane, surrounded by a ring, from which it is separated by a narrow fossa. Both the elevation and the ring consist of close-set papillæ, like the "*papillæ conicæ.*" Over the front part of the tongue, especially near its sides, are other papillæ, named "*papillæ fungiformes,*" which are narrower at their bases than at their summits, and are covered with much thinner epithelium than that which invests the conical papillæ.

See also, for the relations of the Tongue, Series X. 2.

8. 4. A Tongue, of which the left lingual artery was injected with size and vermilion. Scarcely any of the injection has entered the vessels of the right side of the tongue.
8. 5. A similar specimen, in which also the papillæ of the tongue are very distinctly shown.
8. 6. A Tongue, with the trunks and principal branches of the glosso-pharyngeal, hypoglossal, and lingual nerves displayed.
8. 7. The head of a Green Woodpecker (*Picus viridis*), with the hyoid bone and tongue. The tongue is very long and slender, and the horny sheath with which, like most birds' tongues, it is tipped, is barbed at its sides with several sharp recurved processes. The hyoid bone has a slender body placed under the base of the tongue, whence its branches or cornua diverge, and extend backwards to the sides of the vertebral column; then arching forwards over the back of the skull, they again converge, lie in a longitudinal furrow to the right of the middle line, and together enter a canal above the base of the right upper mandible.
- Presented by Drs. F. J. and A. Farre.
8. 8. Portions of the Palate of an Ostrich, showing the numerous and close-set orifices of the palatine glands.
8. 9. The Tongue and Hyoid Bone of a Chameleon. The tongue is extended, as in the act of prehension of food. While at rest, it lies retracted in the mouth, but, by the action of its muscles, it can be in an instant darted from the mouth, and extended to a length nearly equal to that of the creature's body. It is traversed by a central canal, and terminated by an elongated disk, the extremity of which is covered with a viscid secretion, to which the prey adheres, while the tongue is retracted into the mouth.

Presented by Drs. F. J. and A. Farre.

Other illustrations of the Comparative Anatomy of the Tongue are in Series X.

## SERIES IX.

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### THE SALIVARY GLANDS.

9. 1. A Parotid Gland, together with its duct, and the smaller and usually separate portion of the gland, named Glandula Socia Parotidis.
9. 2. A Submaxillary and a Sublingual Gland, with their ducts, and a portion of the mucous membrane of the mouth. Some of the ducts of the sublingual gland open into that of the submaxillary gland; others open directly through the mucous membrane.
9. 3. Part of a Lower Jaw, with the floor of the Mouth, showing the terminations and orifices of the ducts of the submaxillary glands.

The nine following specimens were prepared and presented by Luther Holden, Esq.

9. 4. A Submaxillary and a Sublingual Gland, having their principal ducts injected with mercury.
9. 5. The Parotid Gland of a Dog, of which the principal ducts are injected with mercury and the arteries with wax.
9. 6. The Parotid Gland and Duct of a Dog.
9. 7. The Submaxillary and Sublingual Glands of a Dog, having

part of their minute ducts filled with mercury, and their arteries injected with red size.

- 9. 8. A similar preparation dried.
- 9. 9. The Parotid Gland of a Dog dried after the minute injection of its ducts with mercury.
- 9. 10. A similar preparation.
- 9. 11. A similar preparation.
- 9. 12. The Parotid Gland of a Dog, displaying a similar minute injection of its ducts with quicksilver, and of its blood-vessels with red size.



## SERIES X.

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### THE ORGANS OF DEGLUTITION: FAUCES, PHARYNX, AND ŒSOPHAGUS.

10. 1. A Tongue, with the soft palate and its arches, and the pharynx laid open from behind.
10. 2. Vertical sections of a Head, displaying the parts concerned in deglutition and the nasal cavities. The left half exhibits the following parts, tracing them from below upwards, and from before backwards :—the cavity of the mouth, with the median sections of the lower and upper jaw-bones, the left submaxillary duct, part of the tongue, the halves of the epiglottis, larynx and pharynx, and of the soft palate and uvula, and the left arches of the palate, the anterior or palato-glossal, and the posterior or palato-pharyngeal arch, between which a part of the left tonsil may be seen. Above the palate, the left nasal fossæ are shown, and portions of bougie are introduced into the nasal duct under the anterior part of the inferior turbinated bone, and into the orifice of the antrum under the middle turbinated bone. The orifice of the Eustachian tube is shown behind, and on a level with, the end of the inferior turbinated bone; the frontal, ethmoidal, and sphenoidal sinuses are laid open, and the cerebral nerves are dissected at the foramina, whence they pass through the base of the skull.

The right half of the head exhibits, together with the sections of the tongue, larynx, pharynx, and palate, the

whole nasal septum, and a more complete view of the frontal and sphenoidal sinuses, into which portions of bougie are passed from the nasal cavities.

10. 3. A Pharynx, with the principal adjacent parts. Fine injection impelled into the right thyroid arteries, has filled the small vessels of the right halves of the pharynx, larynx, and thyroid gland, but has not passed into any vessels on the left side.
10. 4. Portion of an Œsophagus, displaying, in separated layers, the outer longitudinal, and the inner circular, muscular fibres, and the external surface of the mucous membrane.
10. 5. Portion of an Œsophagus and Stomach inverted, and showing the longitudinal folds and finely-wrinkled surface of the mucous membrane of the lower part of the œsophagus.
10. 6. The Fauces, Pharynx, and Larynx of a Calf. The soft palate has no uvula.
10. 7. The Tongue, and part of the Pharynx of an Ostrich (*Struthio Camelus*), with the aperture of the glottis exposed. The tongue is of simple form, broad and short, deeply wrinkled and covered with thick cuticle, which is continued, growing thinner as it proceeds, over the wall of the pharynx. In the wall of the pharynx are strong, conical, curved and pointed processes.
10. 8. The Crop, or dilated portion of the œsophagus of a Macaw (*Macrocerus*). It is inflated and dried, but shows still its strong bands of circular muscular fibres. The dilatation is pyriform, and affects, though unequally, the whole circumference of the œsophagus.  
Presented with the next specimen by Drs. F. J. and A. Farre.
10. 9. The Œsophagus and Crop, together with the Tongue, Larynx, and Trachea of a Silk-Fowl (*Gallus lanatus*). The crop is a single spheroidal dilatation, affecting scarcely more

than half the circumference of the œsophagus. Part of its walls, as well as those of the trachea and proventriculus, are coloured with a black pigmentary formation, similar to that in the periosteum and several other parts of the same bird.

10. 10. The Tongue, Lingual Bone, and Pharynx of a Tortoise. The tongue is small, hard, thick, nearly covered with orifices of small tubes. The lingual bone presents an elongated median body, and two long cornua. The pharynx is very large and simple. The glottis is widely opened.
10. 11. The corresponding organs in a Land Tortoise (*Testudo*). The tongue is covered with long, soft, filiform papillæ.
10. 12. Part of the Œsophagus of a Turtle (*Chelonia Mydas*), inverted so as to show the strong recurved and sharp-pointed conical processes with which its inner surface is beset, and which serve to keep back during deglutition the slippery vegetable food on which the animal subsists.
10. 13. Part of the Œsophagus of a Boa. In its contracted state its cavity appears less than half an inch in diameter, but it admitted of dilatation to the extent of three or more inches in diameter.

## SERIES XI.

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### THE STOMACH.

Shape and structure of the Human Stomach, 1 to 11.

Comparative Anatomy of the Stomach, 12 to 40.

In the following Series, Nos. 13 to 20, 28, 29, 31 to 39, were prepared and presented by Drs. Frederick J. and Arthur Farre.

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11. 1. A Stomach inflated and dried, so as to show its natural size and form when fully distended.
11. 2. A Stomach, which, after similar inflation, has been divided into two parts by a vertical section from left to right. The œsophageal opening lies in the posterior section; the pyloric in the anterior.
11. 3. The Stomach of a foetus at full period, inflated and dried. Its fundus (greater or left end) is rather less developed, and the curve, from its greater or inferior border to the pylorus, is more nearly simple, than in the adult human stomach.
11. 4. A Stomach uniformly contracted. The removal of its upper or lesser arch displays the numerous folds or wrinkles of mucous membrane that proceed tortuously, but in a general longitudinal direction, from the fundus to the pylorus. The

contraction here shown is such as commonly exists in the stomach at the beginning of the digestion of a meal.

11. 5. A Stomach, of which the fundus is dilated, but the middle portion is closely contracted, and the portion near the pylorus is dilated in a much less degree than the fundus. The form here shown is often observed in the later periods of digestion, when it is probable that the pyloric half of the stomach is occupied especially with the propulsion of the digested food into the duodenum, while the cardiac half continues to act on the food that is still imperfectly digested.
11. 6. A Stomach, with a nearly similar dilatation of its cardiac half, and contraction of its pyloric half.
11. 7. The Stomach of a child, inverted after the minute injection of the blood-vessels of its mucous membrane.
11. 8. Portion of the Stomach and Duodenum, showing the narrow and nearly circular orifice of the pylorus.
11. 8 A. A similar specimen dried after inflation.
11. 9. A longitudinal section of part of a Stomach and Duodenum, showing the size and form of the pylorus, the gradual thickening of the muscular coat of the stomach traced towards that opening, and the strong band of circular fibres which, like a sphincter, surround it.
11. 10. Portion of a Stomach and Duodenum, through which a longitudinal section has been made by the side of the pylorus, so as to show both its opening and the arrangement of the muscular fibres around it.
11. 11. Portion of the Stomach of a Child, in which, scattered beneath the mucous membrane of its lesser arch, numerous small bodies, like Peyer's glands, appear.
11. 11 A. The Stomach of a Monkey. It deviates from the human



form only in that its pyloric portion is turned more sharply towards its lesser arch.

11. 12. The Stomach of a Tiger (*Felis Tigris*). It shows, as do the following specimens to No. 20, the characteristic features of the stomachs of carnivorous Mammalia; the simple form, the large capacity and roundness of the cardiac portion, the comparatively small size of the pyloric portion, the somewhat nearer approximation (as compared with the human stomach) of the œsophagus to the cardiac end, and the uniformity in the structure and arrangement of the coats.
11. 13. The Stomach of a Lion (*Felis Leo*).
11. 14. The Stomach of a Cat (*Felis domesticus*).
11. 15. A similar but larger specimen.
11. 16. The Stomach of a young Leopard (*Felis Leopardus*).
11. 17. The Stomach of a Dog (*Canis familiaris*).
11. 18. A similar, but larger specimen.
11. 19. The Stomach of a Badger (*Meles vulgaris*).
11. 20. The Stomach of an Ichneumon.
11. 21. The Stomach of a Rat (*Mus decumanus*). The cardiac portion forms more than half the cavity of the stomach, the œsophagus entering at nearly the middle of the upper or lower arch. To the right of the œsophagus the stomach appears encircled with a line which marks the termination of the thick epithelium covering its cardiac portion.
11. 22. The Stomach of a large Rat (*Capromys Fournieri*).
11. 23. The Stomach of a Fœtal Calf, as an example of the stomachs of Ruminants. The œsophagus, of comparatively small size, opens into a large cavity, called the Rumen or Paunch, which presents at its upper part, next to the œsophagus, two large chambers, or recesses from its main cavity, and at its lower part, two of smaller size. At its upper part the

rumen opens, with a wide aperture, into a smaller cavity, with a reticular internal surface, named Reticulum, or Honey-comb-bag. A portion of the wall being removed from the reticulum, exposes both its opening into the œsophagus and also a muscular groove or canal, leading from the œsophagus to a third cavity, with a very deeply-plicated internal membrane, named Psalterium or Manyplies. Several of the deep crescentic folds, projecting into this cavity, are shown by the removal of part of its wall; through which, also, is shown its large valvular aperture of communication with the fourth cavity of the stomach, the Abomasus or Rennet.

In the ruminants, the food, after a first mastication, passes into the rumen; thence, being in portions transferred into the reticulum, it is from it regurgitated through the œsophagus. After a second mastication, it is conveyed through the œsophagus into the psalterium. For the muscular fibres of the groove or canal, already referred to as extending between the orifices of the œsophagus and psalterium, being dilated, permit these orifices to lie (as in the preparation) far apart, and in this position the œsophagus opens directly into the rumen; but when, in the swallowing of the food masticated a second time, the same fibres contract, they move away from the œsophagus the orifices of the rumen and the reticulum, and bring into direct continuity with it the orifice of the psalterium. From the psalterium, the food, having undergone the digestive action of its secretions, passes into the abomasus, where its gastric digestion is completed. Into this cavity, which has a simple elongated oval form, the milk of the suckling calf passes directly from the œsophagus, being subjected neither to rumination nor to the digestive action of the psalterium, the plicæ of which remain in contact so long as the young animal subsists on milk.

11. 24. The Stomach of a Deer, displaying the same relations of its corresponding portions. The removal of portions of the walls of the reticulum and abomasus has displayed the relative position of the orifice of the œsophagus to those of the rumen, reticulum and psalterium. The folds of membrane are also shown, which include the muscular

fibres, and bound the groove extending from the œsophagus to the psalterium. The plicæ projecting into the last-named cavity are displayed more distinctly than in the preceding specimen.

11. 25. The Stomach, together with part of the Colon of a Kangaroo (*Macropus*). The stomach is composed of three chief portions: a cardiac, middle, and pyloric. The cardiac and middle portions are sacculated like the human colon; the pyloric portion is of more simple form. The œsophagus opens obliquely, and with a crescentic valve, at the junction of the middle and cardiac portions of the stomach. The cardiac portion terminates in two small sacculi.
11. 26. A similar specimen.
11. 27. The Stomach of another species of Kangaroo. It presents a similar triple division, and the œsophagus opens in a similar manner; but none of its parts is sacculated. The cardiac portion is a long cylindriform curved sac, the principal axis of which is at right angles with that of the comparatively small middle portion.
11. 28. The Stomach with the Œsophagus and Crop of a Kite (*Milvus vulgaris* s. *ictinus*) inverted. The mucous membrane of the upper part of the œsophagus, and of the crop, which is formed by partial dilatation of its wall, appears of nearly simple structure, presenting only a few small apertures like the orifices of gland-ducts. In the lower part of the œsophagus such orifices are much more numerous; and they become more so as the œsophagus approaches the proventriculus, into which it dilates, and which, with thicker walls, presents a more marked glandular structure. The gizzard, placed beyond the proventriculus, and separated from it by a slight constriction, is lined with simple mucous membrane. The pyloric orifice is small and plicated, and the duodenum covered with villi.
11. 29. The lower part of the Œsophagus, with the Proventriculus, Gizzard, and part of the Small Intestine, of a Fowl (*Gal-*

lus domesticus). The mucous membrane of the lower part of the œsophagus is thin and longitudinally folded, and presents numerous minute orifices of glands. In the proventriculus the mucous membrane becomes gradually much thicker and more vascular, and presents a broad ring of large gastric glands, opening on the summits of vascular papillæ. The muscular coat of the proventriculus is also thicker than that of the œsophagus. The cavity of the gizzard is laid open by the division of one of the middle tendons by which its two strong muscles are connected. These muscles are shown with the expansions of the tendons over their outer surfaces. The œsophagus and duodenum open into the upper part of the cavity which the muscles enclose. The flat sides of this cavity are lined with a thick and hard substance, like hard cuticle; its upper and lower parts, over which the tendons lie, are covered with a cuticle of the same kind, but thinner and softer. The mucous membrane of the intestine is very vascular, and covered with long slender villi.

11. 30. Portion of the Proventriculus of an Ostrich (*Struthio Camelus*), displaying the gastric glands, arranged in a longitudinal band. Each gland is of large size, and presents a wide open orifice, and, at the cut edge of the specimen, a deep sacculated or lobed cavity. The bases of the glands rest on the muscular coat, and, in the upper part of the specimen, are exposed by its removal.
11. 31. The Œsophagus and Stomach of an Heron (*Ardea cinerea*), distended and dried. The œsophagus is of large size; at its lower part it is continued, without any constriction, into the proventriculus, which presents a broad ring of glands, and leads, without change of size, to the part corresponding to a gizzard. On the walls of this part a digastric muscle is arranged in thin layers; and beyond this rudimental gizzard is a small globular membranous cavity which communicates with the duodenum.
11. 32. The similar Œsophagus and Stomach of a Bittern (*Botaurus stellaris*).



11. 33. The Œsophagus and Stomach of a Sea-Gull (*Larus marinus*). The gizzard is smaller but stronger than in the preceding species.
11. 34. The Œsophagus and Stomach of a Turtle (*Chelonia Mydas*), inflated and dried. The œsophagus is of comparatively large size, and is beset on its inner surface with recurved conical processes (see Series 10. 12). It is continued, beyond a slight constriction, into a simple, elongated stomach, which has strong muscular walls, especially in its pyloric part.
11. 35. Another specimen of the same.
11. 36. The Stomach of a Tortoise (*Testudo*). Its cavity is shorter and wider than that of the Turtle's stomach, but is of equally simple form.
11. 37. Sections of the Œsophagus and Stomach of a Crocodile. The œsophagus opens with a wide orifice into the principal cavity of the stomach, which is of somewhat globular form, and of which the muscular fibres radiate, as in the gizzards of birds, from two lateral and central tendons. This cavity communicates by a narrow valvular orifice with a small round pyloric cavity, which opens with a small oblique aperture into the duodenum: it constitutes a remarkable feature of resemblance between the stomach of the Crocodile and that of some birds, e.g., the Heron (31), and Bittern (32).
11. 38. The Œsophagus, Stomach, and Duodenum of a Crocodile.
11. 39. The Stomach of a Lump-sucker (*Cyclopterus Lumpus*). It has a simple elongated pyriform shape, but its pyloric portion is bent so as to form a very acute angle with the cardiac portion.
11. 40. The Stomach of a Lobster (*Astacus marinus*). Its walls support three hard tubercles of calcareous substance. By these, as gastric teeth, the food is broken and divided before passing into the intestines. The two lateral tubercles are moved so as to break the food upon the middle one.



## SERIES XII.

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### THE INTESTINAL CANAL.

Structure of the human intestinal canal, 1 to 9.  
Arrangement, &c., of its blood-vessels, 10 to 16.  
Anatomy of the ileo-cæcal valve, 17 to 23.  
Comparative anatomy of the intestinal canal, 24 to 50.

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12. 1. A portion of Small Intestine, inflated and dried, with its Mesentery. It shows the mode in which the convolutions of distended small intestine are arranged.
12. 2. Portion of Small Intestine, of which the outer longitudinal, and the inner circular, layers or coats of muscular fibres are separated and displayed.
12. 3. Portions of Small Intestine, dried after inflation of the cellular tissue connecting its several coats.
12. 4. Portions of Jejunum and Ileum inverted. They show the respective characters of the mucous membrane in each of these portions of the intestinal canal. In both it is covered with villi; but these are arranged more closely, and are larger and more prominent, in the jejunum. The mucous membrane of the ileum is smooth, with the exception of a few short and low transverse folds; that of the jejunum is thrown into wide overlapping folds or plaits, named *valvulæ*

conniventes, which extend round nearly the whole circumference of the canal.

12. 5. Portion of Jejunum, displaying the arrangement of valvulæ conniventes. The larger folds, which nearly encircle the canal, are connected by smaller longitudinal and oblique folds of the mucous membrane.
12. 6. Portion of Jejunum spread open. Many of the valvulæ conniventes extend quite round the canal, and, in most instances, the free margin of one of them overlaps the attachment of the next below it.
12. 7. Portion of Jejunum, of which the valvulæ conniventes are remarkably developed. Besides being very large and close-set, many of them present small processes extending from their free margins and surfaces into the cavity of the intestine.
12. 8. Portion of Jejunum, in which the solitary glands are very prominent.
12. 9. Portion of Cæcum, exhibiting an appearance of the orifices of numerous small gland-ducts opening on the surface of its mucous membrane. The orifices are especially numerous on the margins of the ileo-cæcal valve.
12. 10. Portion of Jejunum, displaying, in the bright redness of the mucous membrane after the injection of its blood-vessels, its great vascularity. The villi are long and turgid.
12. 11. Portion of Jejunum, inverted and dried after the injection of its principal blood-vessels. The arborescent arrangement of the arteries, while, after diverging from the mesentery, they proceed round the intestine, is distinctly shown.
12. 12. A similar specimen.
12. 13. Portion of Colon, exhibiting a similar arrangement of its arteries. Their principal trunks diverge from two lines cor-

responding with the attachments of the great omentum and the mesocolon.

12. 14. Part of a Rectum, with its large and tortuous veins injected from the trunk of the inferior mesenteric vein.

12. 15. Portion of Jejunum, of which the veins are partially filled with a milky fluid, like chyle.

12. 16. A similar specimen.

These specimens were taken from the body of a middle-aged woman brought for dissection. The veins in the coats of nearly the whole length of the jejunum and ileum contained a similar milky fluid, which could easily be pressed from them, along their converging canals, to the larger branches of the superior mesenteric vein. The blood of the mesenteric vein, also, could be pressed-down and mingled with the chyle-like fluid in the smaller veins. In different parts of the small intestine were four or five white patches, apparently produced by chyle effused between its coats; but these were in only a few parts, while the veins containing the chyle-like fluid were seen on all parts of the small intestines. The lacteals in the mesentery were not evidently turgid with chyle. Of the mesenteric glands, some appeared healthy, others were changed in structure, and decidedly diseased. (From Mr. Stanley's notes of the examination of the body. March, 1823.)

12. 17. The end of an Ileum, with the Cœcum and its vermiform appendix. The removal of part of the walls of the cœcum displays the ileo-cœcal valve, and the orifice of the appendix. The lanceolate form of the orifice of the valve is shown, as well as its projection into the cavity of the cœcum on the edge of a deep transverse fold, and its nearly transverse position with its apex directed upwards and to the left.

12. 18. A similar specimen, dried. It shows more distinctly than the former how the two portions of the valve are formed by the projection of the walls of the ileum into the cavity of the cœcum.

12. 19 and 20. Two similar specimens.

12. 21. An Ileum and Cœcum, with the ileo-cœcal valve shown in section. The Peyer's and solitary glands of the ileum are well marked.

12. 22. A similar specimen, dried.
12. 23. A Cœcum with an unusually long appendix.
12. 24. Portion of Small Intestine, from a Dog. The villi and glands are greatly developed. The former give the internal surface of the intestine a woolly appearance ; of the latter, some are solitary, the rest in clusters or patches. The patches, corresponding with the Peyer's glands of the human intestines, present numerous deep small pits between intersecting ridges of mucous membrane, and, at the bottom of each pit, a small opaque white spheroidal body, like the isolated acinus of a gland.
12. 25. A similar specimen, displaying especially the long villi of the Dog's Intestine.
12. 26. A similar specimen, in which many of the villi are white with the chyle contained in them.
12. 27. The end of the Ileum and the Cœcum of a Monkey. They have nearly the same form as in man, but there is no appendix of the cœcum.
12. 28. The end of the Ileum and the Cœcum of a Cat. The cœcum is continued into a gradually contracting blind pouch for nearly an inch beyond the entrance of the ileum.
12. 29. A similar specimen.
12. 30. The end of the Ileum and the Cœcum of a Tiger, shaped like the preceding.
12. 31. The corresponding and similarly shaped parts from a young Leopard.
12. 32. The end of the Ileum with the Cœcum and part of the colon of a Rat. The cœcum is large in comparison with



both the ileum and the colon, but is of simple form and not sacculated.

12. 33. Parts of the Ileum and Colon, with the Cœcum of a Dog. The cœcum is long, tortuous, and of small diameter, almost like an appendix of the colon.
12. 34. The corresponding parts of a Kangaroo. The cœcum, six inches in length, extends from the place of junction with the ileum, as a long closed sac continuous with the colon.
12. 35. Portion of the Small Intestine of an Ostrich, displaying its large, flat, and very vascular villi.
12. 36. Portion of the Small Intestine, and the Cœca of a Fowl. The mucous membrane of the small intestine is covered with short thick-set villi: its canal becomes rather smaller where it opens into the rectum between the cœca; and it has here a valvular orifice. Each of the cœca is about eight inches long; their mucous membrane, less vascular than that of the small intestine, is covered with villous processes in the part near their junction with the rectum, but in the rest of its extent is simple and smooth, or but slightly wrinkled.
12. 37. The Cloaca, or dilated terminal portion of the intestine, of a Swan. It receives the terminations of the ureters and oviducts, which enter it in a valvular manner, passing for some distance between its coats before they open on the surface of its mucous membrane. The right oviduct is rudimental.
12. 38. The corresponding and similar parts of an Ostrich.
12. 39. Portion of the Small Intestine of a Turtle (*Chelonia Mydas*). Its mucous membrane is arranged in undulating longitudinal folds, like valvulæ conniventes extended in the direction of the axis of the intestine.
12. 40 and 41. Similar specimens, with the blood-vessels injected.

12. 42. Portion of the Small Intestine of a Turtle, with its strong circular muscular coat exposed.
12. 43. Portion of the Large Intestine of a Turtle. Its mucous membrane is arranged in longitudinal folds or ridges, and appears highly vascular.
12. 44. Portion of the Duodenum of a Turtle, displaying its very thick circular muscular coat, and the reticular arrangement of the folds of its mucous membrane. Bristles are placed in the biliary and pancreatic ducts.
12. 45. The termination of the Small Intestine and the Cœcum of a Turtle. The cœcum differs from the rest of the large intestine only in being slightly larger.
12. 46. The similarly shaped parts of a Crocodile.
12. 47. The Stomach and Intestine of a Skate (*Raia Batis*). The stomach presents a large cardiac portion, and a much smaller pyloric portion proceeding from it at an acute angle. The pylorus, with an abrupt bend, leads into a short intestinal canal, within which the mucous membrane is arranged in the form of a spiral valve, the several turns of which are nearly transverse, and lie close together.
12. 48. A similar specimen, showing the outer form of the organs.
12. 49. The Intestine of a Skate, with its spiral valve displayed.
12. 50. The Duodenum of a Salmon, with its numerous cylindrical "appendices pyloricæ," injected with wax and dried. These appendices, or blind tubular prolongations, have been regarded as forming the homologue of a Pancreas.

## S E R I E S   X I I I .

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### THE LIVER AND GALL-BLADDER.

13. 1.   The larger Blood-vessels of a Liver, injected and exposed by corroding and washing away its other component parts.
13. 2.   Portion of the Surface of a Liver, displaying the stellate mode of branching of the interlobular branches of the portal vein.
13. 3.   A similar specimen.
13. 4.   Section of a Liver, in which the portal vein was injected with red, and the hepatic vein with blue material.   The portal plexuses, formed of capillaries derived from the portal vein, are arranged around the borders of the lobules of the liver ; they enclose small spaces, in the centre of each of which a small blue spot indicates the section of one of the intralobular branches of the hepatic vein.
13. 5.   A similar specimen, in which also the mode of branching of the intralobular veins is shown.
13. 6.   A similar specimen, from the liver of a Cat.  
The three preceding specimens were presented by Francis Kiernan, Esq.
13. 7.   The Liver of a Rat from Cuba (*Capromys Fournieri*).   It is constructed of very numerous and separate small polygonal lobes.

13. 8. A Gall-Bladder, with the cystic, hepatic, and common biliary ducts filled with wax and dried.
  13. 9. The same parts inflated and dried. The appearance of a spiral valve in the cystic duct is shown.
  13. 10. A similar specimen.
  13. 11. A Gall-Bladder of large size, and containing calculi.
  13. 12. A Duodenum, with the biliary and pancreatic ducts. A bougie is placed in the former duct, and a bristle in the latter: they open with a common orifice, at the summit of a papilla, in the second portion of the duodenum.
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## SERIES XIV.

### THE PANCREAS.

14. 1. A Pancreas, displaying its external form, and the arrangement of its lobes.
14. 2. A Pancreas dried after the injection of its principal ducts.
14. 3. A similar specimen.

## SERIES XV.

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### THE ORGANS FOR ABSORPTION OF NUTRIMENT; LACTEAL AND LYMPHATIC VESSELS AND GLANDS.

15. 1. Portion of Small Intestine, with its mesentery, in which the principal lacteal vessels are full of chyle. The veins are injected with some blue material.
15. 2. A similar specimen.
15. 3. Part of the Surface of a Liver, in which the lymphatics are filled with mercury. The beaded form of the vessels, derived from the constrictions in the situation of their valves is distinctly shown.
15. 4. The Lymphatic Trunks of a Gall-bladder filled with mercury.
15. 5. Part of a Spleen, with its lymphatic vessels similarly filled.
15. 6. Large Lymphatic Vessels, filled with mercury; they were, probably, seated in the subcutaneous tissue.
15. 7. A similar specimen.
15. 8. Portion of the Small Intestine of a Turtle, with its abundant lacteals minutely filled with mercury.



15. 9. A similar specimen.
15. 10. A similar specimen, in which also the course of the lacteals in the mesentery is shown.
15. 11. Large Lymphatic Vessels and Glands filled with mercury. The form and arrangement of the valves of the lymphatics may be discerned by the constrictions of their walls. Each large lymphatic, when, as an afferent vessel, it reaches the lymphatic gland, divides into several branches, which run on the surface of the gland, and, subdividing, give origin to the plexus of minute vessels of which the greater part of the gland appears composed. From this plexus are derived other and larger efferent lymphatics, which leave the gland in the same manner as the afferent vessels enter it, but proceed from it in the opposite direction.
15. 12. A similar specimen.
15. 13. A similar specimen.
15. 14. A similar specimen, in which both the afferent and the efferent vessels are well shown.
15. 15. Portion of Small Intestine, with its mesentery, in which the lacteal vessels are displayed entering and leaving mesenteric glands, in the manner above described.
15. 16. A similar specimen.
15. 17. A similar specimen, showing the lacteal vessels and mesenteric glands of some large animal.
15. 18. The Femoral Lymphatic Vessels and Glands of a Horse filled with mercury.
15. 19. The Principal Lymphatic Vessels and Glands of the lower extremity of a Horse.

## SERIES XVI.

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### THE GLANDS WITHOUT DUCTS, OR VASCULAR GLANDS; THE SPLEEN, THYROID AND THYMUS GLANDS, AND RENAL CAPSULES.

16. 1. The Blood-vessels of a Spleen filled with wax, and exposed by macerating and washing away the rest of its substance.
16. 2. Part of the Spleen of a Horse, showing the mode of branching of the splenic artery and vein. The branches of both vessels form nearly right angles with the trunks, and are small in comparison with them. Bristles are placed in the branches of the artery; those of the vein are laid open: both may be traced for some distance into the substance of the spleen, in which, at length, their minute branches cannot be distinguished from the fibrous cords which intersect it.
16. 3. Part of the Spleen of a Horse, macerated after the removal of its capsule. By thus washing away the pulpy substance formed of nuclei and cells, together with the blood and lymph contained in the spleen, a cellular or spongy texture is exposed, which is formed by the close interlacing of fibrous filaments connected with the capsule of the spleen and the coats of its larger blood-vessels. The spaces or interstices between the fibres of this spongy substance are called the cells of the spleen.

16. 4. A similar preparation of part of a Human Spleen, with its arteries injected.
16. 5. A similar specimen.
16. 6. A similar preparation of part of the Spleen of a Calf, dried.
16. 7. A Thyroid Gland, displaying the usual form of its lateral lobes, and of the middle lobe or isthmus connecting them. A section of the left lobe shows part of its structure.
16. 8. A Thyroid Gland, with the larynx and other adjacent parts. Bristles are passed under two slips of muscle, of which one, named *Levator glandulæ thyroideæ*, extends from the right side of the isthmus of the gland to the body of the hyoid bone, the other from the lower margin of the left ala of the thyroid cartilage to the same bone.
16. 9. The Thyroid and Thymus Glands, with the adjacent parts, of a child nine years old. The thymus gland, which is much larger than is usual at this period of life, consists of two unconnected elongated portions, or lobes, which filled the anterior mediastinum, and extended upwards to the thyroid gland.
16. 10. A Thymus Gland of ordinary size and form.
16. 11. A Renal Capsule, dried after the injection of its arteries. They are derived from the renal, supra-renal, and phrenic arteries, whence they converge in radiating lines towards the borders of the renal capsule.

## SERIES XVII.

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### THE HEART.

17. 1. An Heart, with the aorta, and venæ cavæ, and some of their principal branches injected with wax and dried. They are placed in the position which they occupy when the body is erect.
17. 2. An Heart, with the large arterial and venous trunks, dried after the injection of their cavities with wax.
17. 3. A similar specimen: the right auricle and ventricle, the venæ cavæ and the pulmonary artery being filled with dark yellow wax; and the left auricle and ventricle, the pulmonary veins and the aorta, with red wax.
17. 4. A similar specimen, in which also the thoracic duct, vena azygos and œsophagus are shown.
17. 5. A Child's Heart, with the large vessels similarly prepared.
17. 6. Casts in Wax of the four cavities of an Heart; those of the right side in yellow, those of the left in red wax.
17. 7. An Heart, with its cavities and the principal vessels laid open, so as to display their forms, relative positions, and modes of communication.
17. 8. An Heart, in which the Eustachian valve at the opening of

the vena cava inferior into the right auricle, and the valve at the opening of the coronary vein into the same cavity, are distinctly shown. The tricuspid and mitral valves are spread-out.

17. 9. Portions of Adult Hearts, in both of which the foramen ovale in the septum of the auricles has remained open. The opening is in both instances oblique, valvular, one margin overlapping the other, and situated at the anterior part of the fossa ovalis.
17. 10. Section of an Heart. The tricuspid valve is depressed, and in the position which it assumes while the blood is flowing through the open orifice of communication between the right auricle and ventricle. The bicuspid or mitral valve is raised, so as to close the orifice of communication between the left auricle and ventricle, as it does while the left ventricle is propelling blood into the aorta.
17. 11. A Mitral Valve, with the ring of muscular and fibrous substance to which its attached border is connected, and the tendinous cords by which its free border and inferior surface are fastened to the fleshy columns of the left ventricle.
17. 12. Portion of an Aorta, with its semilunar valves closed. Parts of their surfaces, as well as their free borders, are in contact.
17. 13. Portions of Aorta and Pulmonary Artery. The semilunar valves of the aorta are closed as in the preceding specimen: those of the pulmonary artery are open.
17. 14. An Heart, with the coronary arteries and veins injected and dried.
17. 15. A similar specimen.
17. 16. The Heart and Large Vessels of an Elephant, injected and dried. Three venæ cavæ terminate in the right auricle.



17. 17. The Heart, with the principal blood-vessels and the larynx and trachea of a Lion.

Presented by Edgar Barker, Esq.

17. 18. The Heart and Large Blood-vessels of an Ostrich. At the orifice between the right auricle and ventricle are two strong muscular valves. The single pulmonary artery has three membranous valves. At the orifice between the left auricle and ventricle are two membranous valves. The large arteries, into which the left ventricle impels its blood, are the left and right arteriæ innominatæ, from which the subclavian and carotid arteries arise, and the aorta, which arches towards the right behind the venæ cavæ, and over the right bronchus and pulmonary vessels.
17. 19. The Heart of a Condor Vulture, with its several cavities, and its auriculo-ventricular valves displayed as in the preceding specimen. The muscular substance of the heart and of the right semilunar auriculo-ventricular valve is very strong, and the walls of the ventricles are thick in proportion to their capacities, and more nearly of equal thickness than in the hearts of mammalia.
17. 20. The Heart and Principal Blood-vessels of a Turtle injected and dried. It presents two completely separated auricles, and a single ventricle with an imperfect septum. From the ventricle arise three arteries, namely, a right and left aorta and a pulmonary artery.
17. 21. The Heart and Aorta of a Shark. The cavity of the single ventricle is laid open, and the section is continued through the bulbus arteriosus, so as to show its strong muscular walls and its three rows of semilunar valves. The edges of the valves of the lower rows are connected with the valves above them by tendinous cords: those of the upper row are free. Immediately behind the aorta is the large single auricle.

## SERIES XVIII.

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### THE ARTERIES AND VEINS.

Structure and Course of Arteries, 1 to 10.

Structure of Veins, 11, 12.

Relative Anatomy of Arteries and Veins, 13 to 67.

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18. 1. Portion of an Aorta, with its coats dissected. Part of the outer coat, composed of fibro-cellular tissue, mingled with elastic tissue, is separated and turned downwards. Above this the middle coat is similarly shown: it is composed of elastic mingled with muscular tissue, the fibres of which are, for the most part, arranged transversely to the axis of the artery. The outer surface of the internal or longitudinally fibrous coat is exposed, and its smooth compact texture shown: on its inner surface it bears the epithelium.
18. 2. Portion of an Aorta inverted, and with its internal or longitudinally fibrous coat separated and turned downwards.
18. 3. Portion of an Aorta, of which the middle or muscular and elastic coat is split into several layers.
18. 4. Portion of the Splenic Artery of a Horse. When, shortly after the horse's death, the muscular coat of the artery was contracted, so that the canal of the artery was very nearly

closed, the outer or cellular and the elastic coats were separated and turned aside. The canal of the artery was then cut open, and the muscular and internal coats laid flat. The contraction of the muscular coat is shown both by its wrinkling, and by its being now so much narrower than the elastic and cellular coats, which expanded when they were separated from it.

18. 5. The Great Arterial Trunks of a Turtle. They were cut across near the heart during life, and their canals were closed by the contraction of their strong muscular coats.
18. 6. The Spermatic Artery of a Horse, injected and dried so as to show its remarkably tortuous and convoluted course.
18. 7. A similar preparation of the Spermatic Artery of a Bull.
18. 8. A similar preparation from a Bull, in which is shown also the convoluted arrangement of the spermatic artery on the tunica vaginalis testis.
18. 9. Sections of the Spermatic Artery of a Bull, dried after injection with mercury. The various sections of the close convolutions of the single tube give an appearance of a cellular or cavernous structure.
18. 10. The Plexus, or Rete mirabile, formed by the branches of the vertebral arteries of a Calf.
18. 11. Portion of a Femoral Vein, laid open so as to show the general aspect of its coats and valves. Two pairs of large crescentic valves are shown in the main trunk of the vein, and another pair closing the orifice of a large vein opening into it.
18. 12. Portion of the Jugular Vein of a Horse inverted. At its upper part three crescentic valves are placed on the same level: and at its lower part two valves of larger size.

18. 13. The Body of a Child dissected to display the principal arteries and veins. The aorta and its branches are injected with red: the venæ cavæ and their branches with blue; the vena portæ with yellow.
18. 14. Part of a Spine, with the arch and thoracic portion of an aorta, the carotid and subclavian arteries, the venæ innominatæ, vena cava superior, and vena azygos.
18. 15. A similar preparation, in which, besides the above-named vessels, the thoracic duct, and many of the intercostal arteries and veins are shown.
18. 16. A similar preparation, with the Aorta, Thoracic Duct, and Vena Azygos.
18. 17. The Posterior Part of the Walls of a Chest, showing the relations of the aorta to the œsophagus and left bronchus. The bronchial and phrenic arteries are also shown.
18. 18. The Arch of an Aorta, and its principal branches, from a Tiger.
18. 19. Parts of a Chest, and of the Upper Extremities, with the arch and thoracic portion of the aorta, the arteria innominata, the carotid, subclavian, axillary, and brachial arteries, with their principal branches.
18. 20. A similar preparation, but with only the left upper extremity.
18. 21. A Preparation of the Veins, corresponding to the arteries shown in the preceding specimen.
18. 22. Parts of a Head and Neck, displaying the common, external, and internal carotid, and vertebral arteries, and all their principal branches.
18. 23 and 24. Two similar preparations.

18. 25. Section of a Head, with the right carotid artery and its principal branches.
18. 26. The other section of the same Head, similarly prepared.
18. 27. A similar preparation, including the vertebral artery.
18. 28. A similar preparation of the arteries of the Head and Face, and of their corresponding veins, including the temporal, internal maxillary, external jugular, facial and internal jugular veins.
18. 29. Parts of a Chest and Head; in which, together with the principal arteries, there are shown, on the right side, the trunks and chief branches of the facial, temporal, lingual, thyroid, and internal jugular veins, and the axillary and subclavian veins, the *venæ innominatæ*, and *vena cava superior*.
18. 30. The base of a Skull, with the arterial circle of Willis, formed by the anastomosis of the branches of the internal carotid and basilar arteries. The principal cerebral and cerebellar arteries also are shown, as well as the trunks of the vertebral and internal carotid arteries passing tortuously to the base of the skull.
18. 31. The arteries composing the Circle of Willis, and the chief branches proceeding from them.
18. 32. Part of a Skull, showing the course and relations of the ophthalmic arteries.
18. 33. Part of a Skull, with the principal sinuses or venous canals enclosed between the layers of *dura mater*.
18. 34. Parts of a Chest and upper extremities, showing especially the subclavian and axillary arteries and their branches.
18. 35. A similar specimen.



18. 36. An Upper Extremity, with its principal arterics arranged in the most usual manner.
18. 37. A similar specimen from a Child.
18. 38. A similar preparation of both the arteries and the veins of an upper extremity.
18. 39 and 40. Two similar specimens.
18. 41. A Fore-Arm and Hand, with their principal arteries.
18. 42. An Elbow-joint, showing the free anastomosis of small arteries around it.
18. 43. A Hand, with its principal arteries, showing especially the arrangement of the two palmar arterial arches.
18. 44 and 45. Two similar specimens.
18. 46. A Hand, of which the arteries are more minutely injected, so as to show their abundant supply to the balls of the fingers, and the small branches given to the sheaths of the flexor tendons, and to the lumbrical and interosseous muscles.
18. 47. A Hand, with its arterics and veins injected with wax. The wax injected by the arteries passed into the veins, apparently without any extravasation.
18. 48. A similar specimen.
18. 49. A Stomach, Duodenum, Pancreas, and Gall-bladder, with their principal arterics.
18. 50. Parts of an Abdominal Aorta and Vena Porta, with their branches distributed to the stomach, duodenum, liver, gall-bladder, spleen, and pancreas. The trunk of the cœliac

axis is shown, together with its division into the splenic, gastric, and hepatic arteries, and the anastomosis of the gastric and pyloric arteries on the lesser arch of the stomach, and of the right and left gastro-epiploic arteries on its greater arch.

18. 51. A similar specimen, including also parts of the mesenteric arteries and their branches.
18. 52. Portion of Mesentery and small Intestine, spread out so as to show the general mode of distribution of the branches of the superior mesenteric artery and vein. Some of the lacteal vessels are injected with mercury.
18. 53. The Trunk of a Vena Porta, with all its principal branches, and portions of the organs to which they are severally distributed.
18. 54. A Pelvis, with portions of its contained organs and of the femora, and the trunks and branches of the iliac arteries.
18. 55. Portions of a Pelvis and Femur, with the principal branches of the left iliac and femoral arteries and veins.
18. 56. A similar specimen, showing especially the branches of the right internal iliac artery.
18. 57. A similar specimen, showing especially the course and relations of the internal pudic artery and its branches.
18. 58. The front of a Pelvis, with portions of the urinary bladder and penis. The internal pudic arteries and veins and their principal branches are shown.
18. 59. Portion of a Pelvis, with the crural arch, and part of the abdominal muscles. The epigastric artery and vein are shown in their natural relations to the internal inguinal ring.
18. 60. A similar specimen, except in that the trunk of the epi-

gastric artery is curved round the inner margin of the mouth of an oblique inguinal hernia.

18. 61. A right Lower Extremity, with all its principal arteries and veins.
18. 62. A left Lower Extremity, with its principal arteries.
18. 63. A similar preparation, from a Child.
18. 64. The parts composing and surrounding a Knee-joint, with the popliteal artery and its articular and other branches.
18. 65. Part of a Lower Extremity, with the popliteal, tibial, and peroneal arteries and their branches.
18. 66. A Foot, with the lower part of a Leg, showing the course and relations of their chief arteries.
18. 67. A similar specimen, from a Child.

## SERIES XIX.

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### ORGANS OF RESPIRATION.

19. 1. Portion of Lung from which, after inflation and drying, the pleura was removed, so as to show the form and arrangement of the air-cells at its surface.
19. 2. A similar specimen.
19. 3. Portion of Lung of which the blood-vessels are minutely injected.
19. 4. Thin sections of a similarly injected Lung, showing the general form and arrangement of the air-passages and cells.
19. 5. A corroded preparation of a Heart and Lungs. The trachea bronchi, and, in several places, the air-cells, were injected with dark green wax ; the right cavities of the heart, and the pulmonary artery and its branches, with brown wax ; and the pulmonary veins, the left cavities of the heart, and the aorta and coronary arteries, with red wax. After this injection, the tissues of the lung and its vessels were removed by corrosion, maceration, and washing, and the wax remains like a cast of the parts which it filled.
19. 6. A similar preparation, after the injection of both sets of blood-vessels with red wax.

19. 7. A similar preparation of the Pulmonary Arteries and Veins, after a minute injection of the arteries with red, and of the veins with yellow wax.
19. 8. A similar preparation. The arteries were injected with red, and the veins with brown wax.
19. 9. Section of the Lung of an Ostrich (*Struthio Camelus*), in part of which the blood-vessels are injected.
19. 10. Section of the Lung of a Turtle (*Chelonia Mydas*). The main bronchus, passing along the axis of the lung, gives-off on each side numerous large diverging branches, the walls of which appear reticular, through the number of apertures by which they communicate with the larger air-cells. These air-cells are subdivided, by very delicate tissue, into much finer spaces, in which the minute branches of the pulmonary artery are distributed.
19. 11. Section of the Lung of a Turtle, dried after inflation. The large size and incomplete partition of the air-cells near the surface of the lung are well shown.
19. 12. The Organs of Respiration, with the Heart and its large vessels, from a Boa (*Python*). The walls of the trachca are composed, in the anterior and lateral parts, of cartilaginous rings, and, posteriorly, of fibrous tissue. At its lower part, the trachca bifurcating opens at once into the cavities of the elongated saccular lungs. The right lung, of which the anterior part alone is preserved, is laid open: its inner surface is beautifully reticulated with small elevated ridges, enclosing spaces of which the walls are again, by smaller ridges, subdivided into air-cavities or cells. The whole of this structure is highly vascular. The left lung is preserved entire. Its anterior third has the same structure and vascularity as that of the right lung; but, in its posterior two-thirds, the lung is a simple membranous sac, or reservoir for air; and its walls, though presenting traces of the same reticulation as those of its anterior part, are thin, and receive but few and



small blood-vessels. The right and left aortæ, the trunk of the carotid artery given-off from the former, and their junction at some distance behind the heart, are shown; as are also the two branches of the pulmonary artery, and their prolongations along the inner margins of the lungs.

19. 13. Portion of the Lung of a Boa, showing its reticulated internal surface.
19. 14. The Lungs of a Frog (*Rana temporaria*), inflated after the injection of the pulmonary arteries. They are simple sacs, of ovate form, and the irregularities of their outer surface represent the cellular or reticulated character of their interior.
19. 15. The Lungs of a Jersey Toad, inflated and dried.
19. 16. Section of a similar Lung. It is a nearly simple sac, with ridges raised upon its inner surface so as to bound large polygonal parietal cells.
19. 17. The Head of a Fish, with the operculum, or gill-cover, and other parts removed from its left side, so as to expose the branchiæ or gills. The branchiæ are composed of narrow, elongated lamellæ, in which branches of the branchial arteries are minutely distributed, and the axes of which are made stiff with cartilage. These lamellæ are close-set on four branchial osseous or cartilaginous plates, which are attached to the four branchial arches of the hyoid bone.
19. 18. The principal Organs of Circulation and Respiration of a Calamary (*Loligo vulgaris*). The systemic heart, irregularly lozenge-shaped, is in the median line. From its anterior and posterior angles proceed large arteries, the anterior and the larger posterior aorta; each of its lateral angles receives a branchial vein. At the base of each branchia is a branchial heart, which receives the blood returning by the great veins, and propels it through the branchial circulation. The branchiæ consist, on each side, of a double series of pinnate laminæ, closely arranged along the borders of a

median fusiform stem; each branchia bearing upwards of seventy pairs of plates.

Prepared by W. S. Savory, Esq.

19. 19. The branchial Lamellæ and other Organs of an Oyster. The lamellæ are four in number, and of crescentic form. Each consists of a single close-set series of plates, which are severally composed of rows of minute lamellæ set on median bars.
19. 20. An human Larynx and Trachea, in which the several cartilages are shown suspended from the hyoid bone and connected by their ligaments. By the removal of part of the left ala of the thyroid cartilage, the thyro-arytenoid or vocal ligaments are displayed, in such a position as they would naturally occupy in inspiration. The articulation between the left arytenoid and cricoid cartilages is laid open.
19. 21. The Trachea of an Ostrich, with its muscles.

## S E R I E S   X X .

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### URINARY ORGANS.

20. 1.   Section of a Kidney, in which the arteries have been injected, so as to show the contrast between the cortical portion of the organ, which is completely reddened by the injection, and the tubular portions, which remain nearly white. Some of the tubular portions, arranged in converging pyramids, are shown projecting their apices, or papillæ, into the extremities of the calyces, or branches of the pelvis of the kidney.
20. 2.   A similar specimen.
20. 3.   A similar specimen. The different appearances of these specimens are due only to the different degrees in which their blood-vessels are injected.
20. 4.   A similar preparation of the Kidney of a Child. The fibrous covering, or capsule, of the kidney is reflected from one-half of the organ.
20. 5.   The principal Blood-vessels of two Kidneys, displayed by macerating and corroding the organs after injecting the arteries with red wax, the veins with yellow, and the ureter and pelvis with dark green wax.
20. 6.   A similar preparation, after injecting the arteries with red and the veins with dark green wax.

20. 7. Section of a Kidney, with the ureter, pelvis and infundibula, displayed after injection with wax.
20. 8. The Pelvis, Infundibula and Calyces of a Kidney, injected with wax and dried.
20. 9. A similar preparation.
20. 10. Part of a Female Urinary Bladder, displaying the orifices of the ureters, and the muscular fasciculi extending from them to the vesical orifice of the urethra.
20. 11. Kidney of a Dog, with the blood-vessels of its cortical substance injected. The tubular substance is not arranged in separate pyramids, but forms a continuous mass occupying the interior of the kidney.
20. 12. Kidney of a Cat after an injection of the large and delicately branching veins upon its surface.
20. 13. Kidney of a Bear. It is composed of about twenty separate coniform portions, each containing a proper cortical and tubular substance, and each having a distinct excretory duct, communicating with the renal pelvis, about which they are clustered. This form of kidney has peculiar interest, in that it represents a form through which the human kidney passes in its early developement. Compare the specimens of the kidneys in the Series illustrating the developement of the Embryo.
20. 14. Kidney of a Turtle; its arteries being injected with red, and its veins with blue. It is flattened and expanded, deeply and minutely lobed.

## SERIES XXI.

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### VARIOUS PECULIAR SECRETORY ORGANS.

- 21. 1. Anal Sacs or Glands of a Badger (*Meles vulgaris*).
- 21. 2. Anal Sacs or Glands of a Cat.
- 21. 3. The ink-bag of a Calamary (*Loligo vulgaris*).



## SERIES XXII.

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### THE BRAIN AND SPINAL CORD.

22. 1. Portion of a Cerebral Hemisphere, showing the fibrous structure of its white substance.
22. 2. Portion of a Cerebrum, with its blood-vessels injected. They are derived from those ramifying in the highly vascular pia mater.
22. 3. The Half of an adult Brain. The vertical section has been made a little to the right of the middle line.
22. 4. Portion of the Base of a Brain, displaying parts of the crura cerebri, and, in front of them, the corpora albicantia, tuber cinereum, infundibulum, pituitary gland, optic tracts and optic commissure.
22. 5. Vertical Median Section of a Cerebellum, Pons, Medulla Oblongata and other adjacent parts, displaying especially the cavity and boundaries of the fourth ventricle, and of the canal from the fourth ventricle to the third. A bristle is passed beneath the fourth or trochlear nerve winding round the crus cerebri.
22. 6. A Medulla Oblongata, below which is shown the decussation of the fibres connected with the anterior pyramids.
22. 7. Portion of a Brain, including the pons and medulla oblon-

gata. Fibres are shown passing through the pons from the right anterior pyramid to the right crus cerebri; while, on the left side, the fibres that appear to correspond with these, and lie at the same part of the pons, pass from the inferior part of the crus cerebri, to the left crus cerebelli.

This and the two following specimens were prepared and presented by  
Holmes Coote, Esq.

22. 8. Portion of Brain, in which a large bundle of fibres is shown passing from the right restiform tract forwards and inwards into the substance of the pons.
22. 9. Portion of Brain, with the origin of the sensitive or ganglionic portion of the fifth, or trigeminal, nerve, on the right side. The root divides into three portions, of which one passes into the medulla oblongata between the restiform and olivary bodies, another into the middle of the crus cerebelli, and the third extends transversely into the pons.
22. 10. Portion of a Spinal Cord, from the cervical and dorsal regions, together with the several nerves connected with it. The principal things shown are:—1. The mode of origin of the spinal nerves, by anterior and posterior roots, each of which is composed of many fasciculi; 2. On the right side, the ligamentum dentatum, and its pointed attachments, between the roots of the nerves, to the inner surface of the dura mater; 3. The ganglia formed on the posterior roots of the nerves, and having the anterior roots in contact with their anterior surfaces; 4. The formation of the axillary or brachial plexus, by the commingling of the filaments of the last four cervical and the first dorsal nerves; 5. The distribution of the principal branches of the same plexus; 6. The arrangement of the intercostal nerves derived from the first five dorsal nerves. The specimen is described and represented in the “Anatomical Sketches and Diagrams” by Mr. Wormald and Mr. McWhinnie.
22. 11. The lowest part of a Spinal Cord, showing its almost sudden diminution of size before it ends in the filum terminale.

22. 12. A corresponding portion of Spinal Cord, with the numerous long roots of the lumbar, sacral, and coccygeal nerves by which the cauda equina is formed.
22. 13. The Brain, *in situ*, of an Hedgehog (*Erinaceus Europæus*).
22. 14. The Brain and upper part of the Spinal Cord of a Dog (*Canis familiaris*), showing especially the large olfactory lobes.
22. 15. The Brain of a Leopard (*Felis Leopardus*). The upper part of the left cerebral hemisphere, and the left half of the cerebellum, are removed, exposing the corpus striatum, optic thalamus, and the large hippocampus, the corpora quadrigemina, and the floor of the fourth ventricle.
- Prepared and presented with the six following specimens by Holmes Coote, Esq.
22. 16. The Brain of a Cat (*Felis domesticus*).
22. 17. A Vertical Section through the middle line of the Brain of a Sheep, showing especially the cavity of the fourth ventricle, and the valve of Vieussens, of which the grey substance is continued through the corpora quadrigemina into the optic thalamus.
22. 18. Part of the Brain of a Rabbit (*Lepus cuniculus*), showing the fornix and fibres extending from it along both the anterior and the posterior borders of the hippocampi.
22. 19. Part of the Brain of a Rabbit. A fasciculus of fibres is traced from the anterior pyramid of the medulla oblongata, extending forwards, and then directly outwards into the crus cerebelli.
22. 20. The Brain of a Kangaroo (*Macropus Parryi*). The upper part of the left cerebral hemisphere is removed, showing the very

small corpus callosum, and the corpora quadrigemina, of which the anterior pair are much larger than the posterior.

22. 21. Section of the Brain of a Turkey (*Meleagris Gallo-pavo*), showing the cavity of the fourth ventricle and its prolongation between the lobes of the cerebellum, the pineal gland, and the absence of a corpus callosum.

22. 22. The Brain and Spinal Cord of a common Fowl (*Gallus domesticus*). The portions of the spinal cord, with which the origins of the nerves supplying the extremities are connected, are much larger than the portions either above or below them; and the portion corresponding with the nerves of the lower extremities is larger than that connected with those of the upper extremities.

22. 23. The Brain and the upper part of the Spinal Cord of a Turtle (*Chelonia Mydas*). From below, proceeding upwards, are shown, the olfactory lobes, the cerebral hemispheres, the pineal and pituitary bodies, the corpora bigemina or optic lobes, the nearly membranous cerebellum, the wide and shallow fourth ventricle, and the flattened spinal cord.

Presented by Holmes Coote, Esq.

22. 24. The Brain and Spinal Cord of a Jersey Toad. The chief parts shown, *in situ*, are, from below upwards, the olfactory lobes, the elongated oval cerebral hemispheres, the pineal gland, the corpora bigemina, the cerebellum (a broad band dotted with black pigment), the large fourth ventricle, the short and wide spinal cord, and the cauda equina formed by the roots of the lumbar and sacral nerves.

22. 25. The Brain and the upper part of the Spinal Cord of a Cod (*Gadus Morrhua*). From below, proceeding upwards, are shown, the optic nerves, with the slender olfactory nerves between them, the cerebral hemispheres, the corpora bigemina or optic lobes (the left being laid open), the tongue-shaped cerebellum projecting backwards over the fourth

ventricle, and the spinal cord. The origins of the large trigeminal and pneumogastric nerves from the restiform bodies are also shown. A bristle is passed from the fourth or cerebellar ventricle, into the ventricle of the left optic lobe.

22. 26. A similar specimen.

22. 27. The same organs shown in a longitudinal section. The right half being removed, the central canal in the spinal cord, the fourth ventricle, and the cavity or ventricle in the left optic lobe, are exposed.

Prepared and presented, with the two preceding specimens, by Holmes Coote, Esq.

22. 28. The Brain of a large Shark. The same parts are shown as in the preceding specimen. The chief objects to be noted are, the large size, confluence and smoothness of the cerebral hemispheres; the olfactory lobes, beneath and closely attached to the hemispheres, from which a ventricle is continued into them; the hypoaria, beneath the optic lobes, and analogous to the corpora mammillaria, having between and beneath them the hypophysis or pituitary gland; the large size of the cerebellum, which is trilobed and transversely laminated, and extends forwards over the optic lobes as well as backwards over the anterior part of the fourth ventricle; and the vagal columns, a series of nodules projecting into the sides of the lateral ventricles, and corresponding with the roots of the vagal nerve.

Presented by Mark Kebbell, Esq.

22. 29. The Brain and Spinal Cord, with the origins of the nerves, of a Skate (*Raia Batis*). The parts are placed with their inferior aspects directed forwards. In the middle, and above, are the optic nerves, diverging from their origins in the pedicles of the anterior cerebral lobes or cerebral hemispheres, the hypoaria or mammillary bodies, and the optic lobes. At the sides of the optic nerves, are the olfactory nerves, proceeding from the outer parts of the cerebral hemispheres. Below the mammillary bodies, the pituitary gland is suspended; and from above it proceed the third



pair of nerves. From the sides of the medulla oblongata, the fifth, the auditory, the glossopharyngeal, and the vagal, nerves are shown arising. On the posterior or dorsal aspect of the brain, the several parts are shown as in the brain of the Cod (No. 25); but they are all of larger size, and the cerebellum has two convoluted lobes or hemispheres attached to the sides of its middle portion. The spinal cord tapers regularly from above downwards, the several pairs of spinal nerves being given-off from its sides at gradually increasing distances, and gradually diminishing in size.

## SERIES XXIII.

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### THE NERVES.

23. 1. Section of a Nerve, showing its principal fasciculi of filaments, and the vascularity of its neurilemma and of the fibro-cellular tissue between the fasciculi.
23. 2. A similar specimen.
23. 3. Part of a Sciatic Nerve, with its principal fasciculi of filaments separated and displayed.
23. 4. Part of a Popliteal Nerve similarly prepared. The minuter divisions, like branchings, of the fasciculi are here shown.
23. 5. The Trunk of a Trifacial or fifth Cerebral Nerve. A bristle is placed between its ganglionic sensitive, and its non-ganglionic motor, portion.
- This and the four following specimens were presented by A. M. McWhinnie, Esq.
23. 6. The Auditory and Facial Nerves (portio mollis and portio dura of the seventh pair of cerebral nerves) in the internal auditory passage. A bristle is passed under filaments passing from the trunk of one nerve to that of the other.
23. 7. Dissection of Nerves in the Orbit. The objects chiefly shown are, the ophthalmic or lenticular ganglion; its long

root from the nasal branch of the fifth or trifacial nerve; its short roots from the branch of the third nerve, which is proceeding to the inferior oblique muscle; the long ciliary nerves from the lenticular ganglion and from the nasal branch of the fifth; the short ciliary nerves; the supra-orbital, lacrymal, and sixth nerves.

23. 8. Nerves in the front of a Sacrum and Coccyx, displaying the lower portion of the sympathetic or ganglionic system of nerves, and the communications between it and the anterior branches of the sacral nerves.
23. 9. The Penis of an African, with a dissection of the branches of the pudendal nerves distributed in its dorsal and lateral portions.

## SERIES XXIV.

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### THE NOSE, AND OTHER ORGANS APPERTAINING TO THE SENSE OF SMELL.

24. 1. The Nasal Cavities displayed in transverse section. Anteriorly, the section passes through the septum and inferior turbinated bones, and in front of the middle turbinated bones ; posteriorly, it passes through the septum and the inferior and middle turbinated bones, just behind the superior turbinated bones. The thickness, sponginess, and great vascularity, of the Schneiderian membrane lining the nasal cavities are shown. The orifices of the antrum, and of the nasal duct, are indicated by probes passed through them.
24. 2. The right outer wall of the Cavities of a Nose, displaying the three turbinated bones, the three meatus behind and below them, and the openings of the antrum and nasal duct.
24. 3. A similar specimen, with the inferior turbinated bone raised so as to show more distinctly the position of the nasal duct, and with a probe passed through the Eustachian tube.
24. 4. Portions of a Skull, in which are shown the following parts having relation to the Nose : 1. The external nares, with the bones and cabrilages bounding them. 2. The crista galli and cribriform plate of the ethmoid bone, with the orifices for the passage of the olfactory nerves. 3. The

posterior nares, the sphenoidal sinuses and their openings into the nasal cavities. 4. The antra or maxillary sinuses, with their openings. 5. The nasal ducts with the portions of their walls projecting slightly into the cavities of the antra.

24. 5. Section of the Head of a Turtle, showing the left olfactory nerve traversing a long canal above the nasal septum, and distributed on the mucous membrane over the cartilaginous portion of the septum. A bougie is passed through the right nasal passage.



## SERIES XXV.

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### THE EYE, AND OTHER ORGANS APPERTAINING TO THE SENSE OF SIGHT.

Sclerotica and cornea, 1 to 5.  
Retina, 6 to 10.  
Lens, 11 to 14.  
Vitreous humour, 15 and 16.  
Choroid membrane and pigment, 17 to 26.  
Ciliary processes and iris, 27 to 35.  
Marsupium, 36 and 37.  
Lacrymal gland, 39 and 40.  
Eyelids and Harderian gland, 41 to 46.

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25. 1. Section of an Eye, displaying, 1. the sclerotica, its continuity with the sheath of the optic nerve, and its connexion by bevelled edges with the transparent cornea; 2. the choroid membrane (which, as in most of the following specimens, is completely decolorized by the prolonged action of decomposed spirit and light); 3. the ciliary processes, surrounding and somewhat overlapping, 4. the iris; 5. the optic nerve, exposed within its sheath, and passing through a small opening in the sclerotica.
25. 2. A similar section, in which the Retina and Crystalline Lens are also included.
25. 3. The Cornca of a Turkey, dried, with the ring formed of

imbricated bony plates by which it is surrounded, and which are enclosed in the substance of the sclerotica.

25. 4. The Scaly Integument spontaneously detached from the Head of a Snake, including the transparent membranes separated, in connexion with it, from the surface of the conjunctivæ.
25. 5. Sections of an Optic Nerve, showing its mode of passage through the sclerotica, and its apparent constriction therein.
25. 6. Section of the posterior part of an Eye, displaying the internal surface of the Retina.
25. 7. An Eye, from which the posterior part of the sclerotica and choroid membranes has been removed, so as to show the external surface of the retina and its connexion with the optic nerve.
25. 8. The posterior part of an Eye. A slight starred depression extends between the point at which the optic nerve expands to form the retina, and the position of the macula lutea and foramen centrale of Soemmering.
25. 9. A similar specimen.
25. 10. The Blood-vessels of a Retina, minutely injected. The nervous and other tissues have been washed from them.
25. 11. Part of an Eye, giving a view from behind of the retina, ciliary processes, and lens.
25. 12. The Crystalline Lens of a Sheep, broken-up so as to show its fibrous structure.
25. 13. Four specimens of the Lens of the Sheep, displaying the method of arrangement of the bundles of its fibres.
25. 14. The Crystalline Lens of a Calf, dried after the injection of the blood-vessels on the posterior part of its capsule.

25. 15. Section of an Eye preserved in chromic acid. It shows the vitreous humour, traversed by very numerous delicate membranous septa, which converge from its circumference towards its axis. The portion extending through the axis of the eye is homogeneous and undivided, the septa stopping short of it.

Presented by Dr. Hannover.

25. 16. An Hyaloid or Vitreous Membrane, distended and dried together with the lens.
25. 17. An Eye, in which, by the removal of portions of the sclerotica and cornea, the following parts are shown from the front: 1. The external surface of the choroid membrane. 2. The ciliary body or ligament. 3. The iris. 4. The anterior borders of some of the ciliary processes. 5. The lens.
25. 18. Part of an Eye, showing the same structures (except the lens) from behind.
25. 19. A nearly similar specimen, giving a posterior view of the choroid membrane, ciliary processes, iris, pupil, and cornea.
25. 20. A Choroid Membrane, with its principal arteries injected.
25. 21. A similar specimen, with the principal arteries of the choroid membrane and iris injected with plaster of Paris.
- Presented by Dr. Jacob.
25. 22. Part of an Eye, with the choroid membrane made uniformly red by the minute injection of its blood-vessels.
25. 23. The Eye of an Horse, with the veins of the choroid membrane (*venæ vorticosæ*) filled with mercury.
25. 24. Portion of the Choroid Membrane of an Horse, with its veins similarly injected.

25. 25. The Eye of a Dog, with the principal arteries of the choroid membrane injected with mercury.
25. 26. Part of the Eye of a Cat, showing the peculiar silvery blueish surface of the tapetum.
25. 27. The Ciliary Processes of a Choroid Membrane, and an Iris, shown by the eversion of the anterior half of an eye.
25. 28. A similar preparation of Ciliary Processes.
25. 29. An Iris, after the removal of the uvea or black pigment from its posterior surface.
25. 30. A similar specimen.
25. 31. An Eye, with the cornea and iris detached and turned-down, exposing the ciliary processes, ciliary ligament and lens.
25. 32. An Iris, dried after the injection of its principal arteries.
25. 33. Part of the Eye of a Seal (*Phoca vitulina*), exhibiting the anterior branches of the ciliary arteries, passing through the anterior chamber, in front of the iris.
25. 34. The Iris of a Rabbit, dried after the minute injection of its arteries.
25. 35. Part of the Eye of an Ostrich, displaying the ciliary processes and iris, after the removal of the greater part of the dark pigment.
25. 36. Part of the Eye of an Ostrich, showing the Pecten or Marsupium, an organ peculiar to the eye of birds. It is formed of membranous folded laminæ, which are prolonged from the choroid, arranged in the shape of a four-sided pyramid, extending from around the entrance of the optic nerve to the posterior part of the crystalline lens.
25. 37. Section of the Eye of an Ostrich, in which are more distinctly shown the relations of the marsupium to the retina,

and its attachment by a portion of the hyaloid membrane to one side of the posterior surface of the capsule of the lens.

25. 38. An Eye, in which the principal branches of the ciliary nerves are shown by the reflection of the sclerotica from the choroid membrane.

25. 39. Two Lacrymal Glands, with their principal arteries injected.

25. 40. The Eye of a Turtle, with the lacrymal gland and duct. The gland is very large, elongated, and deeply lobed: a short duct, through which a portion of glass is passed, extends from it, and opens just above the external angle of the eye.

Presented by J. Bodman, Esq.

25. 41. The Cartilages of the Eyelids, or tarsal cartilages. On their opposed edges, near the posterior border of each, are a row of small apertures, marking the orifices of the Meibomian glands.

25. 42. A Lacrymal Sac and Nasal Duct, dried after being filled with mercury.

25. 43. The Eyelids of a Horse, including the vertical eyelid, or nictitating membrane, and the Harderian gland connected with it. Bristles are passed into the numerous ducts of the lacrymal glands.

25. 44. The Eyelids and Harderian Gland of a Stag. Bristles are passed into the lacrymal canals, and the ducts of the lacrymal gland.

25. 45. The Eyelids of an Ass. The lacrymal canals and nasal duct are filled with mercury.

25. 46. The Eye of a Brown Owl (*Strix stridula*), with the nictitating membrane and its muscles. The anterior part of the



eye extends forwards, in a nearly tubular form, bearing the cornea at the end of the prolonged sclerotic plates. The muscles of the nictitating membrane are two in number: one of them, called the *quadratus nictitantis*, or *trochlearis*, of an unequally four-sided figure, arises from the outer part of the eye-ball, whence its fibres converge towards the optic nerve, by the side of which they terminate in a free, curved, tendinous margin, which is perforated by a canal for the tendon of the opposite muscle. This, which is called *pyramidalis nictitantis*, or *nictitator*, is of a triangular form: its fibres arise from the inner and lower side of the eye-ball, and converge as they pass towards the *quadratus*, through the loop or pulley of which its cord-like tendon glides. The tendon, winding over the optic nerve, descends and enters a sheath in the lower part of the sclerotica, and then, passing below the cornea, is finally inserted into the lower angle of the free margin of the *membrana nictitans*, along which it is continued for some distance. By the simultaneous action of these two muscles, the third eyelid, or nictitating membrane, is drawn rapidly and forcibly outwards, and with an oblique inclination downwards over the forepart of the eye. The tendon of the *pyramidalis* gains the due direction for that office by winding round the optic nerve; and it is restrained from pressing upon the nerve by the counteracting force of the *quadratus*. The nictitating membrane returns, on the relaxation of its muscles, by virtue of its own elasticity, to the inner corner of the orbit, where it lies folded up when not in use.

Presented by Richard Partridge, Esq.

## S E R I E S   XXVI.

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### THE EAR, AND OTHER ORGANS APPERTAINING TO THE SENSE OF HEARING.

26. 1. The principal parts of the Organ of Hearing, from an human Fœtus. Proceeding from left to right are shown :—
1. The auricle, concha, or external ear. 2. The meatus auditorius externus laid open from the front. 3. At the end of the meatus, the membrana tympani, placed obliquely, and closing externally the cavity of the tympanum. 4. The cavity of the tympanum, exposed by the removal of its upper and anterior walls. 5. Within the cavity, the series or chain of the bones of the internal ear, or ossicula auditus, namely, the malleus, with its handle attached to the inner surface of the membrana tympani, and its processus gracilis directed forwards towards the fissura Glaseri; the incus, articulating with the malleus, and having one process directed backwards to the mastoid cells, and another backwards and inwards to articulate with the orbicular portion of the stapes, the base of which is attached to the membrane of the foramen ovale. The base of the stapes is here raised so as to show the foramen ovale opening from the cavity of the tympanum into that of the vestibule. 6. The cavity of the vestibule; above and behind which are (7.) the three semi-circular canals, while in front of and rather below it, is (8.) the cochlea.
26. 2. The fibrous Cartilage of an external Ear.

26. 3. Section of a Right Ear, in which are shown the meatus auditorius externus, the membrane and cavity of the tympanum, parts of the vestibule and semicircular canals, together with parts of the carotid canal through the petrous bone, and of the mastoid cells, in which bristles are placed. The lining of the meatus auditorius externus, immediately before its entrance into the bone, is perforated with numerous orifices of the ducts of cerumen-glands.
26. 4. Section of a Left Ear, displaying, besides the parts shown in the last specimen, the Eustachian tube, which is laid open from the front, and is marked by a bristle passed into it from the cavity of the tympanum.
26. 5. A similar section of a Right Ear. A bristle is passed beneath the chorda tympani nerve, as it proceeds across the handle of the malleus and the membrana tympani.
26. 6. A Membrana Tympani, dried after the injection of its blood-vessels. Many of the principal branches radiate towards the centre of the membrane to which the extremity of the handle of the malleus is attached.
26. 7. Part of a Foetal Temporal Bone, together with the tympanic osseous ring. The ring, which serves for the insertion of the membrana tympani, is slightly fixed to the lower part of the squamous portion of the bone.
26. 8. A similar specimen, with the membrana tympani fixed in its ring, and the malleus and incus in their normal relations.
26. 9. The Ossicula Auditus of a Foetus. The small portion of bone, which has been sometimes called "os orbiculare," is attached to the long process of the incus.
26. 10. A corresponding set of Ossicula from an Adult. They are scarcely larger than those of the foetus.

26. 11. Part of an Ear, showing the ossicula and muscles within the cavity of the tympanum. The membrana tympani is removed, and bristles are passed under the stapedius, tensor tympani, and laxator tympani muscles.
26. 12. Part of the petrous portion of a Temporal Bone, in which the vestibule, cochlea, and semicircular canals, are exposed. The cavity of the vestibule is laid open.
26. 13. A similar specimen, but with all the cavities of the vestibule, cochlea, and semicircular canals laid open.
26. 14. A similar specimen.
26. 15. Sections of a Right Temporal Bone. In the petrous portion, the cavity of the tympanum is exposed. A black bristle is passed through the hiatus Fallopii, along the canal for the Vidian nerve, into that for the facial nerve, and thence through the canal by which the chorda tympani enters the tympanum. A white bristle is passed through the canal for the tympanic branch of the glosso-pharyngeal nerve (Jacobson's nerve). The Eustachian tube, and the canal for the tensor tympani muscle, are laid open: the edge of the latter is painted red. In the mastoid portion of the bone the mastoid cells are shown.
26. 16. Sections of a Temporal Bone, displaying the cavities of the vestibule, semicircular canals and cochlea, and their several communications with the meatus auditorius internus.
26. 17. A similar specimen.
26. 18. Four Sections of Temporal Bones, displaying parts connected with the internal ear. A description is appended to each specimen.
26. 19. Part of the Temporal Bone of a Seal (*Phoca vitulina*), in which the membrana tympani, ossicula auditus, cochlea, and vestibule, are displayed. Its chief peculiarities are

that the cochlea has only two spiral turns; the semicircular canals are very large; the foramen rotundum is three times larger than the foramen ovale; and the branches of the stapes are very thick.

26. 20. Sections, showing the corresponding structures in the Walrus (*Trichecus Rosmarus*). They are generally similar to the foregoing; but the cochlea has three turns, and the stapes has no opening between its crura, but is like a solid pyramid of bone.
26. 21. The *Membrana Tympani*, with the *Ossicula* of an Ostrich (*Struthio Camelus*). The membrane is convex externally, that is, towards the meatus. The parts representing the malleus and incus are rudimental and cartilaginous: a long and slender bone, expanded at its distal extremity, and named "columella," or "bacillus," occupies the place of the stapes.
26. 22. The *Ossicula* of the Ear of an Ostrich.
26. 23. Section of the Head of a Turtle (*Chelonia Mydas*), showing the *membrana tympani*; the long, slender, and curved *columella*, expanded at its ends; the cartilaginous semicircular canals, and their *ampullæ*; the vestibule; and the trunk and principal branches of the auditory nerve.
26. 24. Part of the Internal Ear of a Skate (*Raia Batis*), with the trunk of the auditory nerve, and the semicircular canals, the membranous tubes and *ampullæ* within which are filled with mercury.

The preparations of the Tongue, and other organs for the sense of Taste, are in Series VIII. and X.



## SERIES XXVII.

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### THE SKIN, AND ITS APPENDAGES; THE ORGANS APPERTAINING TO THE SENSE OF TOUCH.

The vascular parts of skin, 1 to 14.

Cuticle or epidermis, 15 to 21.

Nails and hoofs, 22 to 26 A.

Hairs, 27.

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27. 1. Part of a Finger, in which the blood-vessels are minutely injected. The curved double rows of sensitive papillæ on the ball of the finger, and those arranged in linear ridges on the bed of the nail, are made distinct by the fulness of their vessels.
27. 2. A Finger, dried after a mercurial injection of the blood-vessels of the skin. The cuticle or epidermis has been removed in both these preparations.
27. 3. The Fore-arm and Hand of a Fœtus, injected so as to show the vascularity and general texture of the skin.
27. 4. A similar preparation of the Leg and Foot of a Fœtus.
27. 5. Portion of Cutis, dried after injection of its blood-vessels. The arborescent arterial trunks in the deepest part of the cutis are shown with their numerous anastomoses.

27. 6. Portion of Skin from the neighbourhood of a chronic ulcer in the Leg of a Negro. Both the cutis and the epidermis are thickened. The cuticle or epidermis is reflected, so as to show the great size of the sensitive papillæ of the cutis, which are close-set, cylindriform, and conical vascular eminences, various in size, and, in some cases, beset with slender processes. The forms of the papillæ may be distinctly seen impressed in the inferior surface of the reflected epidermis, in which also it may be observed, that the part nearest to the ulcer is devoid of colour.
27. 7. Portion of Skin from an Axilla, showing, on the inferior surface of the cutis, a part of the layer of large, lobulated sweat-glands. The orifices of the short ducts of these glands are open on the external surface of the cutis.
27. 8. Portion of Skin from over a mammary gland. In raising the cuticle, the continuations of it, which are reflected inwards to form the linings of the hair-follicles, have been drawn out, and now project from its inferior surface. From some of the corresponding follicles in the cutis hairs project; bristles passed through others show their oblique course.
27. 9. Portion of Skin which has been tanned and coloured.
27. 10. Portion of tattooed Skin.
27. 11. A similar specimen; but the epidermis has been removed, so as to show that the coloured particles are imbedded in the substance of the cutis.
27. 12. Section of the Skin of a Porpoise (*Phocæna communis*). It presents, in distinct layers, (1) a thick, dark grey layer of epidermis; (2) a thinner black layer; (3) a very thin layer of cutis bearing papillæ; (4) a layer, half an inch thick, of subcutaneous fat or blubber; (5) a muscular layer or panniculus carnosus.

27. 13. The Skin surrounding an Anus, together with the lower part of the rectum, inverted, so as to show the contrast between skin and mucous membrane, and between the cuticles by which they are severally covered.
27. 14. A similar preparation from an African. Here are also seen the orifices of the numerous sebaceous glands around the anus.
27. 15. The Cuticle of an Infant's Hand, removed, after putrefaction, in a single piece.
27. 16. A similar preparation of the Cuticle of a Foot. In both instances the nails are connected with the cuticle.
27. 17. Portions of the Skin of a Negro. In the upper specimen, a part of the dark brown cuticle is reflected in a single layer; and to the under surface of this layer are attached numerous colourless prolongations of cuticle, which extended into hair-follicles and sweat-glands. In the lower specimen, a part of the cuticle is reflected in two layers, of which the internal is that which has been named *rete mucosum* or *rete nigrum*; the external, drier, and less coloured layer being that more especially named *epidermis*.
27. 18. A similar specimen, with the cuticle reflected in two layers. The internal layer, or *rete mucosum*, is thicker than natural, in consequence of chronic inflammation of the skin. The specimen was taken from the same leg as No. 6.
27. 19. Part of the Skin of the Heel from the same leg. The cuticle is colourless, with the exception of a small quantity of pale brownish colouring matter in the deepest layers of the portion which extended up the side of the heel. The inferior surface of the cuticle presents some small wart-like elevations, which were imbedded in the surface of the cutis.
27. 20. Portion of the Skin of a Negro, with the cuticle reflected in two layers; but both layers are completely decolorized by the long action of light and the products of decomposed spirit.

27. 21. The entire Scaly Covering of a Snake, spontaneously separated from the cutis in the periodical "moult" or exuviation.

Presented by the Rev. P. Roupell.

27. 22. Portion of Cuticle reflected with the Nail from a Great Toe. The cuticle is firmly attached to all the borders of the nail, and from the borders is reflected for a short distance upon each of the free surfaces. The inferior surface of the nail has, on its anterior three-fourths, a laminated structure, with thin lamella-like ridges, arranged in parallel longitudinal lines; the corresponding surface of the posterior fourth presents a similar, but less distinct and less orderly, structure.

27. 23. Sections of the end of a Great Toe, with an old Nail nearly exfoliated, and a new one formed in its place. In the upper specimen, the old nail is completely separated; in the lower, it remains attached (as it was during life) to the anterior half of the new one, their opposed surfaces exactly fitting to each other. From this specimen an outer layer of cuticle was removed; an inner layer, corresponding with the rete mucosum of the Negro, remains attached to the cutis, and has the characteristic reticulated surface.

27. 24. Part of the Great Toe of an old bed-ridden person, in whom the nail, allowed to grow unrestrained, forms a thick, curved, horny appendage, like a claw. It is composed of numerous lamellæ, being probably formed of a succession of nails, growing one under another, like those shown in the preceding specimen.

27. 25. Section of a Middle Toe, with a similar out-grown Nail. A single, long and narrow, nail projects beyond the end of the toe, having layers of hardened cuticle attached to its inferior free surface.

27. 26. The Foot of a Horse, the hoof being removed so as to show the lamellæ, formed of highly vascular papillæ, to which the

hoof is adapted, and by materials from whose blood-vessels its structure is maintained.

27. 26 A. Sections of Horses' Hoofs.

27. 27. Portion of Skin from the Lip of a Tiger (*Felis Tigris*).  
Branches of the superior maxillary nerve are traced to the large bulb-like follicles of the whiskers.



## SERIES XXVIII.

### THE INTERNAL SKELETON (ENDO-SKELETON).

#### ILLUSTRATIONS OF VERTEBRÆ.

of Myelonal or Trunk-vertebræ, 1 to 20 D.

of Cephalic or Cranial Vertebræ, 21 to 25.

Human skeletons, 26 to 28.

Human skulls of Caucasian form, 29 to 41.

of Mongolian form, 42 to 46.

of African form, 47 to 59.

Various, 60 to 65.

Missshapen, or with unusual sutures, 66 to 75.

Various sections, &c. 76 to 85.

Various parts of human skeletons, 86 to 101.

Skeletons, skulls, and separate bones of Mammalia, 102 to 253.

Quadrumanæ, 102 to 115.

Cheiroptera, 116.

Insectivora, 117 to 122.

Carnivora, 123 to 175.

Cetacea, 176 to 187.

Pachydermata, 188 to 212.

Solidungula, 213 to 216.

Ruminantia, 217 to 233.

Rodentia, 234 to 250.

Marsupialia, 251-1 A.

Monotremata, 252-3.

Birds, 254 to 283.

Accipitres, 254 to 259 A.

Passeres, 260-1.

Scansores, 262 to 264 A.

Gallinæ, 265-6.

Cursores, 267-8.

Grallæ, 269 to 272 A.

Palmipedes, 273 to 283.

Reptiles, 284 to 309.

Chelonia, 284 to 293.

Sauria, 294 to 300.

Skeletons, skulls, and separate bones of Ophidia, 301 to 303.

Batrachia, 304 to 309.

Fishes, 310 to 327.

In the following Series the disarticulated skulls, 22-3-4, and many of the larger skeletons, or of the animals from which they were obtained, were purchased with part of a donation of £100, given to the Museum by James Bentley, Esq., 'Treasurer of the Hospital.

The following specimens were presented by Drs. Frederick J. and Arthur Farre :—  
108, 109, 119, 124, 125, 130, 136, 143, 145, 148, 151, 152, 153, 155, 160, 165, 167, 181, 209, 210, 223, 225, 230, 240, 241, 245, 246, 247, 258, 259, 260, 262, 262<sub>A</sub>, 264, 265, 274, 275, 277, 300, 302, 326.

With the exception of Nos. 21 to 25, the skulls illustrating the vertebral construction were prepared by Holmes Coote, Esq.

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All animals possessing a spinal cord and brain, or myelencephalon, possess also an internal skeleton of firm cartilaginous, or harder osseous, parts; and of this skeleton, the axial portion, or that which extends through the length of the body, having its axis parallel with that of the myelencephalon, is composed of a series of segments, named *vertebræ*. Hence, the animals with brains and spinal cords are called, as synonymously, "Myelencephalous" and "Vertebrata."

All *vertebræ*, whether in the same or in different animals, have certain features of relation or resemblance; they are constructed after one type, pattern, or idea; although their shapes are extremely diverse, according as they are limited to their primary purpose of supporting and protecting the nervous and vascular trunks, or are adapted to various secondary purposes, such as those of enclosing the organs of special sense, and of supporting appendages or limbs for prehension, station, locomotion, and other offices of sentient and active life. The proper study of the skeleton having thus its foundation in that of *vertebræ*, the following specimens are arranged so as to illustrate their general or typical characters, first in the spine, and then in the cranium, as a preface to the study of the entire skeletons, or their principal sections.

The parts which may enter into the construction of a vertebra, the parts by the assemblage of which a vertebra would be typically complete, are as follows:

#### 1. A Centrum (*c*) or body\*.

\* The initial letters, *c*, *n*, &c., on any parts of the following specimens, will indicate the vertebral element on which they are placed, in accordance with the enumeration of component parts given above. The names and methods of description are copied from those of Professor Owen.

2. Two neurapophyses (*n*), laminæ, or arches, surmounting the centrum, and enclosing part of a canal for the nervous trunk, myelencephalon, or brain and spinal cord.
3. A neural spine (*n. s.*), or spinous process, over the junction of the neurapophyses.
4. Two hæmapophyses (*h*), below the centrum, answering to the neurapophyses above it; and enclosing, or contributing to enclose, a canal for the great hæmal trunks.
5. An hæmal spine (*h. s.*), related to the hæmapophyses, as the neural spine to the neurapophyses.
6. Two diapophyses (*d*), or superior transverse or lateral processes.
7. Two parapophyses (*p*), or inferior transverse or lateral processes.
8. Two pleurapophyses (*pl.*) or ribs; combining, with the diapophyses and parapophyses, to enclose lateral canals for blood-vessels.
9. Zygapophyses (*z*), oblique or articulating processes.

Such a vertebral segment of the skeleton may also, on any of its parts, support appendages (*a*), or may enter into relation with parts of the exo-skeleton, or dermal bones (*d. h.*, *d. n.*, &c.)

28. 1. The Body or Centrum of one of the Vertebræ of a Shark (Cestracion). It is short, cylindriciform, and imperfectly ossified at its circumference, four deep depressions marking the parts at which the chief processes were, in the recent state, connected with the body. The terminal surfaces of the body are hollowed out in cones, and are covered with osseous plates marked with concentric circles. The centre of the body is perforated with a small aperture.

28. 2. Longitudinal Sections of part of the Vertebral Column of the same Shark. By the mutual apposition of the bodies or centra of the vertebræ, cavities are enclosed of biconical form. Within these cavities, and retained by elastic ligaments uniting the bodies of the vertebræ, there was, in the recent state, a clear fluid, the remains of the chorda dorsalis, on and around which the vertebral column was developed.

28. 3. Transverse Sections of the Bodies or Centra of two Vertebræ of the same Shark. The part of each vertebra, which is included between the terminal funnel-shaped plates, consists of osseous triangular laminæ, converging from its circumference to its centre. Four large spaces remain between the laminæ, two at the upper, and two at the lower part of the vertebræ, which corresponded with the bases of the neurapophyses and parapophyses.
28. 4. Section of the Body of a Vertebra of another species of Shark (*Galeus*). Its general characters are similar to those just described, and it shows similar cavities, which corresponded with the bases of the neurapophyses and parapophyses. But the substance of the body is composed, not of converging lamellæ, but of an irregular, soft, cancellous tissue. The arrangement of four portions, converging to the centre, marks the usual mode of ossification of the bodies of the vertebræ of fishes; namely, in two portions corresponding with the terminal concave plates, and four portions composing the intermediate substance of the body.
28. 5. Two Vertebræ of a Turbot (*Rhombus maximus*). The bodies or centra are thin and round, and their opposed surfaces present conical depressions; but the depression on one is much deeper and more uniform than on the other surface. From the upper part of each of the centra, there extend upwards (or, to the left as it would appear in the ordinary position of this flat fish) two laminæ, or neurapophyses, which converge to enclose the canal for the spinal cord, and, from their convergence, bear a long spinous process, or neural spine. The neural spine is grooved on its anterior and posterior surfaces, and into each groove is fitted a long slender bone, the internural spine. Each of the two interneural spines, belonging to each vertebra, is connected at its extremity with a long dermo-neural bone, or fin-ray, which, lying in the fin, forms part of the exo-skeleton, or dermal skeleton, of the fish. With the lower or right border of the centrum of each vertebra, bones are connected, which



correspond with those just described, but extend in the opposite direction. They are parapophyses, or inferior transverse processes, which converge and unite to form the hæmal canal; an hæmal spine, united with them at their convergence; two interneural spines, fitted in the grooves of the hæmal spine; and at their distal extremities two dermo-hæmal bones. From each side of the centrum, above the converging parapophysis, a short process extends transversely outwards. This may be regarded as another branch or division of the parapophysis\*.

28. 6. Two Vertebræ of a Herring (*Clupea Harengus*). They are among those most remarkable for the number of "appendages" to the proper elements of the vertebræ. On the junction of the neurapophyses, where they enclose the spinal canal, are two long, thin neural spines; and a yet longer and more slender appendage is attached to the side of each neurapophysis, whence it extends upwards, outwards and backwards, between the muscles of the back. Similar appendages diverge outwards from the short parapophyses, or transverse processes, attached to the lateral and inferior parts of the centrum; and again, other very slender appendages proceed from the ribs, or pleurapophyses, near their articulation with the parapophyses. At their distal extremities, the ribs are connected with a dermo-hæmal bone of scale-like form, bearing two sharp diverging processes.

28. 7. The last Vertebræ of the Trunk, and the first of the Tail of a Cod (*Gadus Morrhua*). The bodies or centra present at both ends the usual cone-shaped depressions, which, in the recent state, were filled with a gelatiniform fluid, the remains of the chorda dorsalis. The arches, or neurapophyses, of each vertebra, spring from the upper parts of

\* The skeleton of the plaice (No. 319), shows that when the parapophyses, according to the usual type in fishes, bend down and converge to form the hæmal arches in the caudal region, they, or at least those of the anterior caudal vertebræ, bifurcate or give-off processes, which extend transversely, and form "spurious transverse processes."



the anterior extremity of its body, and coalesce together, and with a long spinous process or neural spine. From the corresponding lower parts of the bodies of the vertebræ spring transverse processes or parapophyses. On the anterior vertebræ these merely diverge and end; but in the posterior they are united with reduced ribs or pleurapophyses, which bend downwards, and coalesce to form the hæmal arches of the caudal vertebræ. Each such hæmal arch bears an hæmal spine.

28. 8. The fifth Trunk-Vertebra of a Pipe-fish (*Fistularia*). Its neurapophyses are wide and thin osseous plates, which coalesce and bear a thin neural spine. From the anterior part of the body or centrum, on each side, a long parapophysis extends directly outwards, and is expanded at its end; and from the posterior part, on each side, a short spinous diapophysis.
28. 9. The Bones of the Tail of a Plaice (*Platessa communis*), as an example of the fusion of the elements of vertebræ. The centra of the last caudal vertebræ are united in an apparently single bone, with the sides of which are united, in a single fan-shaped layer, all the corresponding neural and interneural, hæmal and interhæmal, elements of the same vertebræ. But the corresponding dermo-neural and dermo-hæmal bones of the exo-skeleton remain distinct, forming the frame-work of the caudal fin. They are twenty in number, and bifid at their distal ends.
28. 10. A Cervical Vertebra from a Crocodile. It may be studied as combining nearly all the characters of a typical vertebra in a simple form. Its body, or centrum, elongated and cylindriciform, is concave at its anterior, and convex at its posterior extremity. At each side, inferiorly, the centrum bears a low process, the inferior transverse process, or parapophysis; and superiorly, a similar but smaller process, or diapophysis, which articulates with a prominence on the base of the neurapophysis. The neurapophyses, or arches,

articulating with the body or centrum, converge to enclose the spinal cord. They bear, on the middle of the line of their convergence, the spinous process or neural spine, and, diverging from the extremities of the same line, the articulating processes, or zygapophyses. The proximal portion of the pleurapophysis, or rib, is bifurcate; one of its divisions articulates with the diapophysis, the other with the parapophysis; and these several parts, together with the body of the vertebra, enclose an elongated aperture, within which the vertebral vessels lie. The distal portion of the pleurapophysis is prolonged backwards and forwards. In the median line of the inferior surface of the body is a slightly elevated ridge, or hypapophysis.

28. 11. The Fifth Dorsal Vertebra of a Crocodile. The relations of the centrum, the neurapophyses, the neural spine, and the zygapophyses, may be at once recognized by comparison with those of the cervical vertebra. The diapophysis and parapophysis, or superior and inferior transverse processes, are combined in one broad, flat, and elongated process, bifurcate at its extremity. (In the complete skeleton, No. 294, it may be seen that, in the successive dorsal vertebræ, the parapophysis is placed more and more near to the superior part of the centrum, till, at the fifth, the small eminence that represents it is transferred to the side of the neurapophysis, and united to the diapophysis.) At the end of this compound process are two articulating surfaces, to which are adapted those of the rib or pleurapophysis. The ribs arch downwards and inwards, and at their distal extremities are articulated with hæmapophyses, bones corresponding with the human costal cartilages. The hæmapophyses converge, and at their extremities are united to a portion of sternum, forming the hæmal spine of this vertebra.

28. 12. A Lumbar Vertebra of the same Crocodile. The pleurapophyses, or ribs, are not present as bones. The hæmapophyses form an inferior osseous arch, composing one of those which have been named abdominal ribs, and which are repre-

sented by the tendinous lineæ transversæ of the human recti abdominis muscles.

28. 13. Two Vertebræ of a Boa (*Python Sebæ*). They are chiefly remarkable for the number of articulating surfaces which they present, each having twelve. At each extremity of the body there is such a surface, the anterior being concave, the posterior convex : these form ball-and-socket joints with the corresponding parts of the vertebræ preceding and following. At each extremity, also, of the neurapophyses there are two flat articulating surfaces, which are so arranged that the anterior part of the neurapophyses of each vertebra may be received within, and slide upon, the posterior part of the neurapophyses of the preceding vertebra. Corresponding movements can take place between the proper zygapophyses, of which each vertebra has four, projecting outwards from the sides of the neurapophyses. Lastly, at the sides of the anterior part of each centrum, are two low processes, with articulating surfaces for the ribs or pleurapophyses.
28. 14. The Vertebral Column of a Frog (*Rana temporaria*). All the vertebræ succeeding to that with which the pelvis is connected are fused into a single long and slender bone, in which none of their several elementary parts can be distinguished, except in that the inferior part of the bone, representing the coalesced centra, is cylindriciform, while the upper part, raised on this, and answering to the neurapophyses and their spines, is crest-shaped. The sacral vertebra, with which the pelvis is connected, bears longer and stronger parapophyses than the other vertebræ of the trunk ; and to the ends of these are attached the ilia, the long rib-like forms of which, as well as their connexions, point them out as the pleurapophyses of this vertebra. The ischia and ossa pubis united, as hæmapophyses, to the ends of the ilia, complete the pelvis or hæmal arch of the sacral vertebra. The remainder of the vertebral column is remarkable for the small number of its trunk-segments : they are only eight.
28. 15. One of the Thoracic Vertebræ of a Turtle (*Chelonia Mydas*),

as an example of the peculiarities of form produced by transverse extension of some of the vertebral elements. The neural arches of the vertebra extend over the intervertebral space next below it, and over the anterior half of the next vertebra; and their bases are united in the same manner to both these vertebræ. The neural spine bears a large quadrangular plate of bone, placed transversely over it, and united by serrated suture to similar plates on the vertebræ before and behind, and on the ribs. Each rib articulates with two centra and their intervertebral substance, and bears on its upper surface, or expands so as to form, a plate of bone, united, as already described, to the plate on the neural spine, and by similar serrated suture to the similar plates on the ribs preceding and following it. It is by the close junction of these osseous plates on the neural spines and ribs that the "carapace" is formed, for the support of the dorsal shell of the turtle, marks of which are impressed on the outer surface of the bones. The distal end of each rib is connected with narrow and longitudinally placed hæmapophyses, which, by the junction of their ends with those of the other adjacent vertebræ, formed part of a complete ring of bone, placed beneath the outer border of the dorsal shell. With these bones are also connected, by ligament, two portions of the sternum, or plastron, which, as expanded hæmal spines, were joined, by serrated suture, with other similar portions, to form the osseous plate for the support of the inferior shell.

28. 16. The last two Cervical Vertebrae of a Vulture. In each vertebra, the body, or centrum, is broad and flattened, and presents, at its extremities, surfaces for articulation with the vertebræ next preceding and following it. Of these surfaces, the anterior is convex from side to side, and concave from before backwards, while the posterior is concave from side to side, and convex from before backwards; an arrangement adapted for the combination of free movement with strength. On its inferior surface the body presents a slightly elevated ridge, or hypapophysis; from the borders of its superior surface rise broad laminæ, or neurapophyses,



which curve inwards and unite to form the neural canal. In the median line of the junction of the neurapophyses is set a broad spinous process, or neural spine. From the upper and lower parts of the sides of the body proceed the diapophyses and parapophyses, or upper and lower transverse processes; the ends of which are connected by the rudimental ribs, or pleurapophyses, so as to form with them foramina for blood-vessels. In the posterior of these vertebræ the pleurapophysis has been separated from these connexions and rejoined with wire. Articulating processes, or zygapophyses, project forwards from the junction of the neurapophyses and neural spine, and backwards from the diapophyses.

28. 17. One of the Thoracic Vertebræ of the same Vulture. Most of the parts of this vertebra resemble those just described; but the ribs, or pleurapophyses, are here fully developed, and articulate moveably with the same parts as those with which the rudimental ribs, in the foregoing specimen, have coalesced. A long process, homologous with the head of the human rib, articulates with the parapophysis; a shorter process, or tubercle, with the diapophysis. On its posterior border, each rib has a flat thin appendage, which is directed upwards, backwards, and inwards. The distal end of each rib is articulated with an hæmapophysis; and the distal end of this bone articulates with the sternum, which is formed by the confluence of the expanded hæmal spines of the thoracic vertebræ. So much only of the sternum, as may be supposed to have appertained to the elements of this vertebra, is here preserved.
28. 18. Sections of the Pelvis of the same Vulture; showing an extreme modification of the appearance of the vertebral column, through coagitation of vertebræ, which, though coalesced, yet retain traces of their essential separateness. (Compare, in relation to this point, the coalesced and simplified caudal vertebræ of the Frog and the Plaice, Nos. 14 and 9.) In the longitudinal sections of the sacrum are shown the principal elements of fourteen vertebræ, coalesced to form



this apparently single bone. The centrum of the first sacral vertebra bears on its lower surface a large bifurcate hypapophysis, and at each upper margin an articulating process, or zygapophysis, like those of the thoracic vertebræ. This first centrum is also, by its larger size, distinguished from the others, which, successively diminishing in size, and laterally expanded, bear only faint traces of their distinction in the transverse lines that mark their inferior surface, and in the corresponding plates of bone by which they are partitioned within. The laminæ or neurapophyses are almost wholly united in one plate of bone closing the neural canal; but their distinctness is indicated by the foramina which gave passage to the several pairs of sacral nerves. One long keel-shaped ridge of bone is formed by the united neural spines, or spinous processes; but its composition of fourteen parts, corresponding with the other vertebral elements, is shown by the number of thin vertical lamellæ of bone by which its interior is partitioned. Rudiments of parapophyses appear in two small elevations on the first two vertebræ; and close by them are depressions, with which the heads of the last two moveable ribs on each side articulated. From the third to the sixth vertebra, and from the tenth to the fourteenth, rudimental ribs, or pleurapophyses, are anchylosed at their expanded ends to the corresponding centruns, and to strong diapophyses. To the whole extent of this junction of pleurapophyses and diapophyses is united the elongated ilium, which may be regarded as a second or distal portion of one pleurapophysis, developed beyond the rest, and connected with their distal ends, as well as with that of its own proximal portion. The ischium is united to the distal portion of the ilium, and the os pubis to that of the ischium, whence it curves inwards to complete the pubic arch; this hæmal arch being, probably, formed by two hæmapophyses, of which the os pubis represents that of a vertebra succeeding the one to which the ischium appertains.

28. 19. A Vertebra from a Porpoise (*Phocæna communis*). The centrum consists of two thin plates of bone, separate from,

but fitting, the surfaces of an intermediate thick disk. In this condition it permanently represents the usual mode of ossification of the bodies of vertebræ in Mammalia; namely, from three centres, of which one forms the chief mass of the body, and the others its terminal and articulating surfaces. The neurapophyses ascend from the middle piece of the centrum, and are united at their junction with a long neural spine. Equally long parapophyses extend straight outwards from the sides of the centrum.

28. 20. An Human Cervical Vertebra. Its centrum or body, transversely oval, presents, at its lower border, a broad descending process, or hypapophysis, answering to that of the cervical vertebra of the Bird (No. 16). From each side of the body proceeds a 'transverse process' composed of three elements; namely, a parapophysis anteriorly, a diapophysis posteriorly, and a pleurapophysis externally. The pleurapophysis or cervical rib is bifurcate; one portion, answering to the tubercle of a thoracic rib, being united with the diapophysis; the other, answering to the head of a thoracic rib, being united with the parapophysis. The foramen for the passage of the vertebral artery and vein is thus enclosed by the junction of the three elements, di- par- and pleur-apophysis, together with the first portion, or pedicle, of the neurapophysis or lamina. (See the plainer relations of the corresponding parts in the cervical vertebra of the Crocodile, No. 10). With the junction of the pedicles and the posterior parts of the diapophyses, are connected, on each side, the two zygapophyses, oblique, or articulating processes; and from the same point proceed the laminae or neurapophyses. The neurapophyses, converging to enclose the neural canal, meet posteriorly at an angle, and bear a bifurcate neural spine, or spinous process.
28. 20 A. An Human Dorsal Vertebra, with its two corresponding ribs and a portion of the sternum. The conditions of the centrum or body, the zygapophyses or articulating processes, the neurapophyses, with their pedicles and laminae, and the neural spine or neurapophysis, closely correspond with those

in the preceding vertebra. But the parapophysis is not developed; and the diapophysis forms a strong clavate transverse process. The pleurapophysis, developed to the full size of a thoracic rib, is articulated movcably with two points; namely, by its tubercle with the extremity of the diapophysis, and by its head with the bodies of this and the next vertebra above. At its distal extremity each rib has a costal cartilage, the homologue of the hæmapophysis, such as is shown in the thoracic vertebra of the Bird (No. 17); and these hæmapophyses unite with a portion of the sternum, as with their hæmal spine, to enclose the great hæmal organs.

28. 20 B. A first Lumbar Vertebra. The characters in which its elements chiefly deviate from those last described are, that the pleurapophysis or rib appears here as the transverse process, having coalesced with the side of the centrum or body, and with the lowly developed diapophysis. The character of the transverse process, as a rib, will be evident by comparing it with the twelfth and eleventh ribs in the entire skeleton. The same comparison will illustrate the characters of the diapophyses in this vertebra. In the eleventh and twelfth dorsal vertebræ, the diapophysis presents two processes near its distal extremity: one ascending, named metapophysis; the other descending, named anapophysis. Similar processes may be seen on this lumbar vertebra; but, in consequence of the extreme shortening of the diapophysis, they here appear placed, the superior on the upper and posterior part of the superior zygapophysis or articulating process, and the lower at the junction of the pleurapophysis and rudimental diapophysis.

28. 20 c. An Human Sacrum. An apparently single bone, it is composed of the elements of five vertebræ. The five centra or bodies are distinguished by transverse elevated lines at their junctions anteriorly. The five pairs of neurapophyses are equally distinguishable, though united so as only to leave apertures for the transmission of the posterior branches of the sacral nerves. Four of the pairs of neurapophyses bear neural spines; the fifth pair do not coalesce the

lower part of the neural canal, being here closed by dura mater. In front, there is a similar union of the pleur-di- and zygapophyses, room being left for the transmission of the anterior branches of the sacral nerves. The probable relations of the ossa innominata to the first sacral vertebra are stated in the description of No. 18.

28. 20 D. Second and third Bones of an Human Coccyx. They represent the centra or bodies to which alone the vertebræ are reduced in the coccygeal portion of the human spine.

VERTEBRÆ OF THE HEAD; CRANIAL OR CEPHALIC VERTEBRÆ.

The same plan or pattern of construction, which is traced in all the bones forming and appended to the median column or axis of the skeleton, in relation with the spinal cord and its nerves, may be found in the bones that compose or are appended to the skull. In the skull, the vertebral pattern of construction, the construction with successive similar or homologous segments in a linear series, is less evident than in most parts of the trunk; partly because of the extreme modifications of external shape by which the several vertebræ are adapted to the brain and the organs for the higher senses; and partly because, among the essential parts of the cranial vertebræ, other bones are inserted or intercalated, which are no proper parts of vertebræ, but belong, either to the organs for the senses, or to the dermal or outer skeleton, or to the splanchno-skeleton for the internal viscera. Yet, amid the complexity of arrangement hence arising, a plan of construction may be discerned, which is conformed in all essential characters with that of the vertebræ of the trunk already illustrated.

The following specimens are prepared and marked according to the system and nomenclature of Professor Owen, for the illustration of the characters and relations of the cranial vertebræ in each of the four classes of the vertebrate animals. A complete description of them would exceed the limits and purposes of this Catalogue; but one will be found with them, extracted from Professor Owen's descriptions of the similar specimens in the Museum of the Royal College of Surgeons. It may suffice to state here, that the chief design of the following specimens is to illustrate the doctrine, that



the skull (*i.e.*, the cranium and face), is essentially composed of four vertebræ, homologous with the vertebræ of the trunk, and adjusted to the four principal divisions of the Encephalon or Brain.

The divisions of the Encephalon, as best exemplified in that of the Fish (Series 22, Nos. 25, 28), are, (1) the Epencephalon, comprising, as its most essential parts, the medulla oblongata and the cerebellum; (2) the Mesencephalon, comprising the optic lobes, the parts forming the proper walls of the third ventricle, the pituitary and pineal glands; (3) the Prosencephalon, or cerebral hemispheres; (4) the Rhinencephalon, or olfactory lobes or ganglia. Corresponding with these, there are, in the skull, four vertebræ; namely, (1) the Epencephalic or occipital; (2) the Mesencephalic or parietal; (3) the Prosencephalic or frontal; (4) the Rhinencephalic or nasal. Each of these cranial or cephalic vertebræ is essentially constructed of elements corresponding or homologous with those of the spinal or myelonal vertebræ, and their parts receive corresponding names. Thus, they have their neural arches, which are named respectively the Epencephalic or occipital arch, Mesencephalic or parietal, &c. Their hæmal arches are similarly designated, or are named, (1) Scapular, or scapulo-coracoid; (2) Hyoid, or stylo-hyoid; (3) Mandibular, or tympano-mandibular; (4) Maxillary, or palato-maxillary. The diverging appendages attached to these hæmal arches are in the same order: (1) the Pectoral; (2) the Branchiostegal; (3) the Opercular; (4) the Pterygoid.

For the sake of brevity and easier distinction, each element of a cranial vertebra bears a single special name, which is commonly employed rather than the name which would directly indicate its homology. Thus, the centrum or body of the occipital vertebra is named basi-occipital (1); its neurapophysis is named exoccipital (2); its parapophysis, paroccipital (3), and so on. Or, where that element of a vertebra which, in one animal, may appear as a single bone, is, in another, divided into more than one, each of these bears also a special name; as, *e.g.*, in the skull of the fish, in which the pleurapophysis of the frontal vertebra, called tympanic in higher animals where it is single, is considered to be composed of four bones, named respectively, epitympanic, mesotympanic, pretympanic, and hypotympanic.

As already stated, certain bones, not proper elements of vertebræ, are inserted or intercalated among the bones of the skull, and form,



in some cases, even considerable portions of its walls. Such are the bones of the sense capsules; namely, for the ear, the petrosal; for the eye, the sclerotic; for the nose, the ethmoid and turbinal. Such also are the bones of the branchial arches of fish. Moreover, certain dermal bones, parts of the dermo-skeleton, or exo-skeleton, are placed among the proper elements of the cranial vertebræ, as the supra-temporal, and others.

In all the following specimens of separated skull-bones, the same numbers are employed to refer to the homologous, or corresponding bones; *e. g.*, the basi-occipital bone is, in all the skulls, marked 1; the exoccipital, in all, 2; the supra-occipital, in all, 3, and so on; and the same numbers are used for reference in the descriptions. Moreover, in all the skulls, the parts of the occipital vertebra, and its appendage, are numbered on yellow paper; those of the parietal, on green; those of the frontal, on blue; those of the nasal, on pink. The bones of the splanchno-skeleton are marked with white paper on a black ground; and those of the sense-capsules, with white paper on a dark red ground.

28. 21. The bones of the Skull of a Cod (*Gadus Morrhua*), disarticulated from each other, and arranged in nearly their natural relative positions.
28. 22. A similar preparation of the Bones of a Skull of a Turtle (*Chelonia Mydas*).
28. 23. A similar preparation of the Bones of the Skull of an Ostrich (*Struthio Camelus*).
28. 24. A similar preparation of the Bones of the Skull of a Lamb (*Ovis Aries*).
28. 25. A similar preparation of the Bones of an Human Skull.
28. 26. An Human Skeleton. The characters by which it is chiefly distinguished in comparative anatomy are as follows:—(1) the position of the occipital condyles, which is such that, in the erect posture, a vertical line from the centre of gravity of the head, would fall between them; (2) in the same posture,

the nearly horizontal plane of the articular surfaces of the condyles; (3) the plane of the face being nearly the same with that of the front of the frontal bone; (4) the arrangement of the curves of the spine, so that a vertical line, drawn from the summit of the column, would fall nearly on the centre of its base; (5) the length and pyramidal form of the lumbar portion of the spine; (6) the great breadth of the sacrum in proportion to its length, and its deep arch; (7) the width and shortness of the pelvis; (8) the great length of the femur, its direction slightly inwards, and the length and obliquity of its neck; (9) the width of the bones of the knee-joint, and the lengthening of the internal condyle of the femur; (10) the great proportionate size and strength of the foot, the large size of the first or 'great' toe and its parallel position to the others, the arch of the sole, and the length, size, and arched form of the os calcis, and the strength of its tuberosity; (11) the expansion of the chest, especially its flatness in front and its great transverse diameter, and its hollows at the sides of the spine; (12) the length and strength of the clavicle; (13) the outward direction of the glenoid cavity of the scapula; (14) the hemispherical head of the humerus, its adaptations to free movement, and its shortness in comparison with the femur; (15) the articulations of the radius and ulna for mutual rotation; (16) the whole construction of the hand, especially its size and strength, and the capacity of the thumb to be forcibly opposed to any or all of the other digits.

28. 27. Skeleton of a Negro, six feet four inches high. The bones of the extremities are enlarged with deposits of new bone in consequence of periostitis.

28. 28. Skeleton of a Man, four feet two inches high. Except in that the spine has an excessive posterior curve in the dorsal region, the bones are well formed. The head, as is usual in cases of arrested growth, is disproportionately large.

28. 29. Skull of an European, probably of an Englishman. Its principal distinctive features, as one of the Caucasian form

of Blumenbach, are (1) the width and elevation of the forehead, the frontal bone becoming wider, and the whole frontal region more capacious, in the ascent from the orbits to the vertex of the cranium; (2) the nearly vertical direction of the forehead; (3) the regularly and smoothly oval form of the whole cranium; (4) its capacity in proportion to the size of the face; (5) the narrowness of the face, so that the zygomata do not project beyond the lateral boundaries of the skull; (6) the slight projection of the jaws, and the consequently large facial angle; (7) the nearly vertical position of the alveolar processes and of the teeth, constituting, with the preceding feature, the orthognathous character.

28. 30. Skull of an European, probably an Englishman.

28. 31. Skull of an European Woman.

28. 32. Skull of an European Child, about two years old.

28. 33. Skull of an European Child, at birth.

28. 34. Skull of an aged European Woman. It is very small; the forehead is low and pyramidal, and the alveolar processes of both the jaws have been absorbed.

28. 35. Skull of a Greek, from the Island of Scio. The outline of the cranium forms an elongated and nearly regular ellipse.

Presented by Charles Steel, Esq., R.N.

28. 36. Skull of a Swedish Man.

28. 37. Skull of a Swedish Woman.

Presented, with the preceding, by Professor Andreas Retzius.

28. 38. Skull of a Native Maltese.

Presented by Professor Galland.

28. 39. Skull found in a tumulus at Ewell, near Epsom, with some very rude pottery which was considered to be early British.

Presented by Hugh Diamond, Esq.

28. 40. Skull of a German.

28. 41. Skull of a German.

28. 42. Skull of a Chinese. The chief features of the Mongolian or pyramidal form which it illustrates are:—(1) the width of the space between the zygomata, due to the width of the superior maxillary bones and of the anterior parts of the malar bones; (2) the largeness of the zygomata; (3) the flatness of the face, due to the want of prominence of the nasal bones and of the nasal processes of the superior maxillary bones; (4) the width and the slight prominence of the alveolar margins of the maxillary bones; (5) the comparatively narrow forehead, and its narrowing as it ascends towards the vertex; (6) the shortness of the antero-posterior diameter in proportion to the lateral diameter of the skull.

28. 43. Skull of a Turk, having the chief characters of the brachycephalous form indicated by Professor Retzius, in the smallness of its antero-posterior diameter as compared with either the lateral or the vertical diameter.

28. 44. Skull of an Hindoo. The brachycephalic character is well marked; the occiput very flat and high; the jaws very prominent, and the incisor and canine teeth as oblique as in the most prognathous African skull.

28. 45. Skull of an Hindoo, in form nearly intermediate between that of the preceding and the oval or Caucasian form.

Presented, with the preceding, by R. Roberts, Esq.

28. 46. Skull of a Peruvian Indian, in most of its features resembling No. 44, but with a larger cranial cavity, and peculiarly wide in the space between the parietal prominences. From a cemetery of Indians at the village of Quillague, belonging to the republic of Peru, lat.  $51^{\circ} 53'$ , about twenty miles from the western coast of America.

Presented by Dr. Pratt.



28. 47. Skull of an African Negro, illustrating the Negro form of Blumenbach, and presenting, very strongly marked, the prognathous, and dolichocephalic characters. (1) The jaws are very prominent, and the facial angle commensurately small; (2) the incisor and canine teeth project obliquely forwards, meeting at an obtuse angle; (3) the face is flat, though less so than in the preceding form; (4) the forehead is very narrow, receding, low, not widening as it ascends; (5) the length of the skull is great in proportion to its width and height; (6) the total capacity of the skull is small.
28. 48. Skull of an African Negro. With the other characteristics rather less marked than in the preceding skull, this shows a peculiar flatness of the temporal and lower parietal regions, and a marked hollowing of the temporal portion of the sphenoid bone, leaving a great space for the temporal muscle.
28. 49. Skull of an African Negro. Except in a somewhat greater prominence of the jaws, it scarcely deviates from the average characters of the oval or Caucasian form. The temporal suture is obliterated.
28. 50. A similar specimen; but with a rather flatter and wider face, and with a more nearly pyramidal form of the forehead.
28. 51. Skull of an African Negro, in which width and flatness of the face are combined with prominence of the jaws. In other characters, also, this skull has a form intermediate between the well-marked pyramidal and prognathous forms.
28. 52. Skull of an African Negro, in form intermediate between the oval and the prognathous.
28. 53. A similar specimen.
28. 54. Skull of a Man, the offspring of a Mulatto and an European. The slight projection of the jaws and chin, and the flatness



of the temporal regions, are the only Negro features that it presents.

Presented by C. L. Norton, Esq.

28. 55. A Skull, probably that of a Negro, from Antigua.

Presented by Dr. Conquest.

28. 56. Skull of a Native of New South Wales. The face is broad and flat; the jaws very wide, but not very prominent; the supra-orbital ridges are very prominent, and between them a remarkable prominence over the frontal sinuses far overhangs the nasal bones; the forehead is extremely narrow, and becomes narrower as it ascends; the general form of the cranium is long, narrow, and high; its height, however, is chiefly in its median part, and its base is wide.

28. 57. Skull of a Native of Moreton Bay, New South Wales, presenting the same characteristics, but rather less marked.

Presented with the preceding by Joseph Hodgson, Esq.

28. 58. Skull of a Native of New Zealand. In its general features it resembles the last two; but the orbital and frontal prominences are less marked, the forehead is less receding, and the median part of the cranium less raised.

Presented by Thomas Wilson, Esq.

28. 59. Skull from New Holland.

Presented by George Langstaff, Esq.

28. 60. A Skull of unusually large size.

28. 61. The Skull of Bellingham, who, in 1812, was executed for the murder of the Right Hon. Spencer Perceval.

28. 62. A Skull of remarkable width and roundness, supposed to have been that of a man killed at the battle of Hastings.

28. 63, 64. Two Skulls, dug from a ground believed to have been used for burials during the great plague in London.

28. 65. A Skull, marked for the study of phrenology.

Presented by Dr. Spurzheim to Mr. Abernethy.

28. 66. Skull of an European of unusual shape ; long, wide, and low.

28. 67. Skull of an European, unusually flattened in the interorbital and parietal regions.

28. 68. Skull of an European, with the parietal and occipital regions very low in comparison with the frontal.

28. 69. An European Skull, of which the right side is higher than the left, giving it an appearance of obliquity, or defective symmetry.

28. 70. A Skull of similar shape, but with the left side higher than the right. Six ossa triquetra are in the line of the lambdoidal suture.

28. 71. A Skull with a similarly oblique form, in which all the parts of the right side are rather smaller than the corresponding parts of the left.

28. 72. An obliquely formed Skull, having its right half somewhat more anterior than the left, and in its occipital region rather smaller.

28. 73. A Skull, in which the right half of the coronal suture is obliterated.

28. 74. A Skull with the frontal suture persistent.

28. 75. A Skull with all the sutures nearly obliterated.

28. 76. A Skull through which various sections have been made for the display of its chief parts, and of those of the internal ear.

28. 77. A similar specimen.

28. 78. Part of a Skull divided through the vertical median plane.
28. 79. Part of a Skull divided transversely and vertically through the junction of the occipital and sphenoidal bones.
28. 80. Antero-posterior section of a Skull, with the chief processes of the dura mater, falx major, falx minor, and tentorium.
28. 81. The posterior half of a Skull, showing especially the position and connexions of the tentorium.
28. 82. Section of a Skull, with the same processes of dura mater.
28. 83. Antero-posterior section of a Skull, marked for the illustration of the longitudinal and right lateral sinuses, and of the middle meningeal artery.
28. 84. Base of a Skull, with the course of the chief blood-vessels marked on it.
28. 85. A Skull, on the exterior of which the course of the chief sinuses is marked.
28. 86. A Spinal Column and Sacrum.
28. 86 A. A vertical median section of a Spinal Column and Sacrum.
28. 87. A Spinal Column and Pelvis.
28. 88. The Spinal Column and Pelvis of a Child about five years old.
28. 89. The Skull and Trunk of a young Negro.
28. 90. A large Male Pelvis, with the upper parts of the femora, and their principal ligaments.
28. 91. A Female Pelvis.
28. 92. The Pelvis of a young person, with one of the ossa innomi-

nata divided into its component elements, ilium, ischium, and pubis.

- 28. 93. An upper extremity.
- 28. 94. The separate Bones of a Carpus.
- 28. 95. A lower extremity ; from an African.
- 28. 96. A Femur of unusually large size.
- 28. 97. A similar specimen.
- 28. 98. A Femur, with an unusually long neck.
- 28. 99. The natural Skeleton of a Foot.
- 28. 100. The Bones of a Foot articulated in three pieces.
- 28. 101. The separate Bones of a Tarsus\*.
- 28. 102. Skeleton of a young Oran-utan (*Pithecus Satyrus*).  
Presented by Dr. Roupell.

Principal characters of the Skeletons of *Quadrumanæ* illustrated by this and the following specimens to No. 115.

(1) The generally anthropoid character ; (2) the nearly horizontal direction of the occipital foramen ; (3) the single frontal bone ; (4) the smallness, and, in most of the following crania, the singleness, of the nasal bone ; (5) the extended inner plate of the malar bone, forming part of the orbit and temporal fossa ; (6) the small palate bones ; (7) the single lower jaw, with its symphysis sloping downwards and backwards ; (8) the general form of the skull, approaching the human form, but differing in the characters mentioned at pp. 115-6-7 ; (9) the sacral vertebræ, composing a sacrum which, though narrow in comparison with that

\* Only the chief specimens of the human bones which are preserved in the Museum are enumerated in this Catalogue.

of man, is broader and hollower than those of the following mammalia; (10) the scapula long, but broad at its neck; (11) the clavicle long, thick, and strong; (12) the humerus very long; (13) the radius and ulna long and slender, and very freely rotating; (14) the fingers long and slender, but the thumb short and small; (15) the pelvis broad, and the ilia carried far back; (16) the ischium, with a spine, and with broad and flat tuberosities; (17) the femur short in comparison with the humerus; (18) the tibia and fibula distinct; (19) the toes long and slender, except the inner toe, which is like the thumb, and thus, making the foot look like the hand, gives the especially quadrumanous character\*.

28. 103. Skeleton of a Pig-tailed Baboon (*Macacus Rhesus*).

28. 104. Skeleton of a young Baboon, probably of the same species as the last.

28. 105. Skeleton of a young Baboon (*Cynocephalus*).

28. 106. Skull of a Mandril (*Papio Mormon*).

Presented by Samuel Weddell, Esq.

28. 107. Skull of a young Baboon (*Macacus nemestrinus*).

28. 108. Skull of a Monkey (*Cercopithecus Mona*).

28. 109. Skull of an American Monkey (*Cebus Apella*).

28. 110. Skull of a Monkey, with the cheek pouches (*Cercopithecus*).

28. 111. Horizontal section of the Skull of a Monkey.

\* This and the following similar enumerations of the characters of the Skeleton in each order of the vertebrata, are collected from the "Elements of the Comparative Anatomy of the Vertebrate Animals." By Rudolph Wagner. Edited by Alfred Tulk. 1845.



28. 112. Vertical antero-posterior sections of the Skull of a Monkey (*Cercopithecus*).

28. 113. The separated Bones of the Head of a Monkey.

In the three preceding specimens, the bones are marked and numbered in accordance with the description of the cranial vertebræ, illustrated by the skulls Nos. 21 to 25 in this Series.

28. 114. The Spinal Column of a Monkey (*Cercopithecus* or *Macacus*).

28. 115. The Articulated Bones of a Monkey's Arm.

These are placed, with the bones of the anterior or thoracic extremities of several other vertebrata, for illustration of the Homology of Limbs.

28. 116. Skeleton of a Bat (*Noctula vulgaris*).

It illustrates the usual characters of the Chiroptera in the following particulars: (1) the large occipital foramen; (2) the single frontal bone; (3) the widely separated intermaxillary bones; (4) the absence of spinous processes on the vertebræ; (5) the osseous, instead of cartilaginous, prolongations of the ribs to the sternum, forming a series of sternal ribs, like those of birds; (6) the T-shaped manubrium, and the anterior longitudinal crest, of the sternum; (7) the anthropoid form and long coracoid process of the scapula; (8) the long singly arched clavicle; (9) the long humerus; (10) the yet longer radius, with the rudimental ulna and its olecranon; (11) the thumb small, free, supporting a claw; (12) the other very slender and long metacarpal bones and digits serving for the support of the membrane of the wing; (13) the pelvis elongated, and with its ossa pubis wide apart, but connected by ligament; (14) the long sharp spine on the os pubis, the rudiment of a marsupial bone; (15) the head of the femur placed between two equal and similar trochanters; (16) the fibula rudimental; (17) the os calcis, bearing a long spur-like bone for the support of that posterior part of the alary membrane which extends

beyond the tail; (18) the general delicacy and lightness of the whole skeleton.

28. 117. Skeleton of an Hedgehog (*Erinaceus Europæus*).

28. 118. Bones of the Fore-leg of an Hedgehog.

28. 119. Skeleton of a Mole (*Talpa Europæa*).

It presents the following peculiar characters, most of which, adapted to its habits of burrowing and living in the earth, distinguish the Mole among the Insectivorous division of the Carnivora: (1) its small and rudimental orbits; (2) the deeply keeled manubrium sterni; (3) the very long and narrow scapula; (4) the short quadrangular clavicle articulating with the humerus; (5) the short, strong humerus, very broad at both its ends, and bearing long processes on both for the attachment of muscles; (6) the thin ridge along the outer side of the ulna; (7) the anterior process at the upper end of the radius; (8) the long sickle-shaped bone on the inner side of the carpus; (9) the breadth and rake-like form of the fore-foot. The pelvis has no symphysis pubis.

28. 120. Skeleton of a Mole (*Talpa Europæa*).

Presented by A. M. McWhinnie, Esq.

28. 121. Skull of a Mole, with part of its vault removed, showing the apertures for the passage of the nasal nerves.

28. 122. The Fore-legs and Sternum of a Mole.

28. 123. Skull of a black Bear of North America (*Ursus Americanus*).

28. 124. Skull of a white Bear (*Ursus maritimus*). A small conical horn-like bone is articulated by serrated suture with the anterior border of the right parietal bone.

28. 125. Skull of a young Bear (*Ursus arctos*).

28. 126. Skull of a Badger (*Meles vulgaris*).

Presented by Morris Lievesley, Esq.

28. 127. Sections of the Skull of a Badger.

28. 128. Skeleton of a Coati Mundi (*Nasua fusca*).

28. 129. Skull of an Ichneumon (*Herpestes griseus*).

28. 130. Skeleton of a Ferret (*Mustela Furo*).

28. 131. Skull of a Pole-cat (*Putorius vulgaris*).

28. 132. Skull of a Weasel (*Putorius ermineus*).

28. 133. Skull of an Otter (*Lutra vulgaris*).

28. 134. Skull of an Otter (*Lutra vulgaris*).

28. 135. Skeleton of a large Greyhound (*Canis familiaris*, var. *Graius*).

Presented by Stephen Stafford, Esq.

As illustrations of the skeletons of Carnivora, the following characters may be observed in this specimen, and, with few exceptions, in those from No. 117 to 175. (1) the thin-walled ampulla, formed by the petrous portion of the temporal bone; (2) the small and united parietal bones; (3) the strong malar bone arched outwards to form part of the great zygoma; (4) the large palate bones; (5) the lower jaw, provided with a broad coronoid process, a sharp process directed backwards from its angle, and its condyle low, lengthened in the transverse direction, and so locked in the glenoid cavity as to admit of little or no lateral motion; (6) the long and narrow sternum; (7) the clavicle rudimental (absent in some, as the Coati, No. 123; more developed in others, as the Cat, 171); (8) the free rotation of the radius on the ulna; (9) the length and narrowness of the ilia, and the obliquity of the pelvis; (10) the distinctness of the tibia

and fibula, though they are very closely approximated at their distal ends.

28. 136. Skeleton of a Dog (*Canis familiaris*).

28. 137 to 145. Nine Skulls of Dogs; 137 and 138. Bull-dogs; 139. Mastiff; 140. Greyhound; 141. Terrier; 142. Spaniel; 143. Wolf-dog.

28. 146. Vertical antero-posterior Sections of a Dog's Skull.

28. 147. A Vertical Transverse Section of a Dog's Skull, showing the frontal sinuses and the perforated plates of the ethmoid bone.

28. 148. A Horizontal Transverse Section of a Dog's Skull, with the bones at its base marked according to the descriptions of the cranial vertebræ, illustrated by Nos. 21 to 25.

28. 149. The separated Bones of a Dog's Skull.

28. 150. A similar specimen; the bones being marked as in No. 148.

28. 151. Skull of a Fox (*Vulpes communis*).

28. 152. Vertical antero-posterior Section of the Skull of a Fox.

28. 153. Skull of a Jackall (*Canis aureus*).

28. 154. Skeleton of a Lioness (*Felis Leo*; fem.)

28. 155. Skull of a young Lion (*Felis Leo*). It shows very well the small separate bone between the occipital and parietals.

28. 156. The first and second Cervical Vertebræ of a Lioness.

28. 157. The Pelvis and Caudal Vertebræ, with the Femora, of the same Lioness.
28. 158 A. to 158 E. Bones of a Lion; viz., two lumbar vertebræ, scapula, os innominatum, humeri, and radius.
28. 159. Skull of a Tiger (*Felis Tigris*).
- Presented by Dr. Roupell.
28. 160. Skull of a young Tiger (*Felis Tigris*).
28. 161. Skull of a young Tigress.
28. 162. Skull of a Leopard (*Felis Leopardus*).
28. 163. Skull of a young Leopard (*Felis Leopardus*).
28. 164. Vertical antero-posterior sections of the Skull of a Leopard. The bony tentorium cerebelli is well shown.
28. 165. Skeleton of a Cat (*Felis domesticus*).
28. 166. Skeleton of a Cat (*Felis domesticus*).
28. 167. Skull of a Cat.
28. 168. Transverse and longitudinal sections of Cats' Skulls, showing especially the bony tentorium.
28. 169, 170. Transverse and longitudinal sections of Cats' Skulls, with the bones marked according to the descriptions of the cranial vertebræ, Nos. 21 to 25.
28. 171. Bones of the Fore-leg of a Cat.
28. 172. Skull of a Walrus (*Trichecus Rosmarus*).

Presented by Charles Beverly, Esq.



28. 173. The os penis of a Walrus (*Trichecus Rosmarus*).

28. 174. Sections of the os penis of a Walrus.

28. 175. Scapula of a Walrus.

28. 176. Skeleton of a Porpoise (*Phocæna communis*). In this, or in some of the succeeding specimens, to 187, the following characters of the skeletons of Cetacea may be observed:— (1) the jaws lengthened-out in the shape of a snout; (2) the cranial bones united by squamous suture (3) a greater or less deviation from lateral symmetry in the nasal and intermaxillary bones and the nasal orifices, the right being larger than the left (see especially 179); (4) the large size and exceeding hardness of the tympanic bones (186-7); (5) the absence of the mastoid processes; (6) the small, rounded, unsymmetrical nasal bones; (7) the small, thin, and flattened malar bone; (8) the large, strong vomer; (9) the posterior ribs articulating with the transverse processes alone; (10) the early ossification of the costal cartilages; (11) the large number of false ribs (in this specimen six pairs); (12) the short and broad sternum; (13) the broad scapulæ; (14) the absent clavicles; (15) the short humeri; (16) the short and flat radii and ulnæ, lying immoveable on one another, in the same plane with the fin-like carpus and hand; (17) the carpal bones without prominences; (18) the four, five, or more phalanges in the longest fingers; (19) the simple rib-like pubic bones alone representing the pelvis, and bearing no posterior extremities; (20) the inferior laminæ and spinous processes (*hæmapophyses* and *hæmal spines*) of the caudal vertebræ.

28. 177. Skull of a Dolphin (*Delphinus Delphis*).

28. 178. Skull of a Dolphin (*Delphinus Delphis*).

28. 179. Skull of a small bottle-nosed Whale (*Delphinus Tursio*).

28. 180. A similar specimen.
28. 181. Skull of a Delphinus.
28. 182. Sections of the Skull of a Delphinus.
28. 183. Vertebra of a Porpoise, with its separate terminal disks.
28. 184. The separated and replaced Bones of the Head of a young  
Spermaceti Whale (*Physeter macrocephalus*). They are  
marked according to the description of the Cranial vertebræ,  
Nos. 21 to 25.
28. 185. A Whale's Vertebra.
28. 186. Tympanic Bone of a Whale (*Balænoptera Boops*).
28. 187. The Tympanic Bones of a Whale (*Balæna Mysticetus*).
28. 188. Skull of an Hippopotamus (*Hippopotamus amphibius*).
28. 189. Skull of an American Tapir (*Tapirus Americanus*).
28. 190. Vertical antero-posterior sections of the Skull of an Asiatic  
Elephant (*Elephas Asiaticus*).
28. 191. Skull of a young Asiatic Elephant.
- Presented by William Sams, Esq.
28. 192 to 203. Bones of a Rhinoceros (*Rhinoceros Indicus*); namely,  
a scapula, humerus, radius, os innominatum, femur, tibia,  
fibula, first and two other ribs, an upper and two other  
dorsal vertebræ, and a lumbar vertebra.
28. 204. Skull of a White-lipped Peccari or Tajassou (*Dicotyles  
labiatus*).

Presented by Arnold Henry, Esq.

28. 205. Sections of a similar Skull.

28. 206. Skeleton of a Collared Peccari (*Dicotyles torquatus*).

The following are the principal characters of the *Pachydermata*, illustrated by this and other specimens from 188 to 212: (1) the small and angular occipital foramen; (2) the lowly developed mastoid process; (3) the single frontal bone; (4) in the Elephant, the large size of the intermaxillary bones for the support of the tusks; (5) the lower jaw single by the early union of its two halves; (6) the numerous dorsal vertebræ, and the long spinous processes of the anterior among them; (7) the clavicles absent; (8) the radius and ulna anchylosed, but not in the Elephant; (9) the metacarpus and phalanges comprising in some (the *Isodactyle*) an even number of toes, in others (the *Anisodactyle*) an odd number; (10) in the *Rhinoceros* (196) and some others, a strong process from the middle of the femur, like a third trochanter; (11) the large patellæ; (12) the metatarsus and phalanges resembling those of the anterior extremities, and differing, like them, in different genera.

28. 207. Skull of a Wild Boar (*Sus scrofa*).

28. 208. Sections of a similar specimen, with the tusks cut.

28. 209. Skull of a Sow (*Sus scrofa*).

28. 210. Skull of a young Pig.

28. 211. Skull of a Babyroussa (*Sus Babyroussa*).

Presented by Capel Bringloe, Esq.

28. 212. Vertical antero-posterior sections of a similar Skull.

28. 213. Skull of a Horse (*Equus Caballus*).

28. 214. Vertical antero-posterior sections of a similar Skull.

28. 215. Bones of a Horse; namely, a cervical, an upper dorsal,

and a lumbar vertebra, a sacrum, scapula, radius and ulna, and an os innominatum.

28. 216. Skeleton of an Ass (*Equus Asinus*). The following characters, distinguishing the *Solidungula*, whether as a division of the *Pachydermata*, or as a separate order, may be observed in this or in the specimens from No. 213:—(1) the small and early united parietal bones; (2) the long nasal bones; (3) the large lacrymal bones, each with a deep pit in its orbital portion for the reception of the Harderian gland; (4) the malar bone extended far backwards, and, with the frontal and zygomatic portion of the temporal, completing the ring of the orbit externally; (5) the single lower jaw; (6) the long and nearly erect spinous processes of the anterior dorsal vertebræ, for the attachment of the ligamentum nuchæ; (7) on the bodies of the cervical vertebræ (215) an articulating cavity posteriorly and convexity anteriorly; (8) the sternum much compressed laterally; (9) the clavicles absent; (10) the ulna having a large olecranon, but its shaft soon becoming thinner and blended with that of the radius; (11) the metacarpus consisting of one large bone and two short styloid appendages (splint-bones); (12) the phalanges, a single series of bones; (13) between the metacarpus and first phalanx, or fetlock, two sesamoid bones (nut bones); (14) between the second and third phalanges (coronary and coffin-bones) one sesamoid, or shuttle-bone; (15) the femur short and provided with a third trochanter; (16) the fibula, a slender appendage to the tibia; (17) the metatarsus and phalanges conformed with the corresponding bones of the anterior extremity.

28. 217 to 222. Bones of a Camel (*Camelus Bactrianus*); namely, a cervical vertebra, pelvis, scapula, radius and ulna, carpus, and femur.

28. 223. Skeleton of a small Musk Deer (*Tragulus Kanchil*).

28. 224. Skeleton of a Red Deer (*Cervus Elaphus*).

The chief characters of the Ruminantia, illustrated by



this and other specimens from 217 to 233, are the following :— (1) the small and early united parietal bones; (2) the bony processes on the frontal bones of the horned species (227-8-9, &c.); (3) the long nasal bones; (4) the lacrymal bone, with the deep pit for the Harderian gland; (5) the extended malar bone, uniting with the frontal to complete the ring of the orbit externally; (6) the large vomer; (7) the intermaxillaries bearing no teeth; (8) the long, slender coronoid processes of the lower jaw, and the small condyles of the same freely moveable upon the shallow glenoid surfaces or cavities; (9) the large intermaxillary foramina; (10) the long and strong spinous processes of the lower cervical and upper dorsal vertebræ; (11) the small scapulæ, without acromion; (12) the absent clavicles; (13) the single metacarpal and metatarsal bones, each marked with a median ridge or line, indicating its formation of two united bones, and each having at its sides two slender bones, the rudiments of others corresponding with themselves; (13) in each foot two principal digits, and two smaller 'spur' or 'dew claws,' supported by the rudimental metacarpal and metatarsal bones.

28. 225. Skull of a young Deer (*Cervus*).

28. 226. The separate Bones of a similar Skull marked according to the descriptions of cranial vertebræ.

28. 227. Skull of an Indian Antelope (*Antilope Caama*).

28. 228. Skull, with the Horns, of an English Sheep (*Ovis Aries*).

28. 228 A. A similar specimen.

28. 229. Skull, with the Horns, of a Prussian Sheep (*Ovis Aries*, var. *polyceros*).

28. 230. Skull of a Hornless Sheep.

28. 231. Vertical antero-posterior sections of a similar Skull.



28. 232. Skull of an Ox (*Bos Taurus*).

28. 233. Skull of a Musk Ox (*Ovibos moschatus*).

28. 234. Skeleton of a Norway Rat (*Mus decumanus*).

This and the following specimens to No. 250, will illustrate the chief characters of Rodentia ; namely :—(1) the thin-walled ampulla formed by the petrous portion of the temporal bone ; (2) the large intermaxillary bones bearing the rodent incisor teeth ; (3) the processes directed backwards from the angles of the lower jaw ; (4) the long and posteriorly expanded sternum ; (5) in many species, a process directed backwards from the end of the spine of the scapula ; (6) the clavicles strong in some (238), in others slender (234), in others absent (247, &c.).

28. 235. Skull of a Rat.

28. 236. The separate Bones of a similar Skull marked according to the description of cranial vertebræ.

28. 237. Skull of a Mouse (*Mus musculus*).

28. 238. Skeleton of a Beaver (*Castor fiber*).

Presented by John Allan, Esq.

28. 239. Skull of a Beaver.

28. 240. Skeleton of a Rabbit (*Lepus Cuniculus*).

28. 241 and 242. Skulls of two Rabbits.

28. 243. Pelvis of a Rabbit.

28. 244. Articulated Bones of the Fore-leg of a Rabbit.

28. 245. Skeleton of a Guinea Pig (*Cavia aperea*).

28. 246. Skull of an Aguti (*Dasyprocta Aguti*).

28. 247. Skeleton of an Acuti (*Dasyprocta Acuti*).

28. 248 and 249. Skulls of two Acutis (*Dasyprocta Acuti*).

28. 250. Skull of a Capybara (*Hydrochærus Capybara*).

Presented by Arnold Henry, Esq.

28. 251. Skeleton of a Kangaroo (*Macropus Parryi*).

28. 251A. Skeleton of a Female Kangaroo of the same Species, with the principal arteries.

The following characters of the *Macropodidæ* or Kangaroo-family of the *Marsupialia*, are illustrated by these skeletons:—(1) the extreme developement of the posterior extremities, in comparison with the anterior or with the trunk; (2) the great developement of the coccygeal portion of the spine; (3) the inferior arches and spinous processes of the coccygeal vertebræ, forming a canal for the passage of the continued trunk of the aorta; (4) the short sacrum, composed in this species of only two vertebræ; (5) the clavicles; (6) the free capacity of rotation between the radius and ulna; (7) the marsupial bones, long narrow processes ascending from the anterior and upper borders of the ossa pubis; (8) the distinct fibulæ; (9) the metatarsal bones, of which, in this species, two are very long, strong, and partially united, and two are slender and rudimental; (10) the corresponding unequally developed phalanges.

28. 252. Skeleton of a Spiny Echidna (*Echidna Hystrix*).

The following characters of the *Monotremata* may be observed in this and the following specimen; (1) the bird-like character of the skull, in the early union of all its bones, and the beak-like prominence of the jaws; (2) the large foramina incisiva; (3) the short sacrum, consisting in this species of only three vertebræ; (4) the ribs articulating with

only the bodies of the dorsal vertebræ ; (5) the early ossification of the anterior costal cartilages, and the expansion of the posterior into broad plates ; (6) the T-shaped manubrium sterni, articulated not only with the first pair of ribs, but with a median process descending from the clavicles, and with processes descending from the scapulæ ; (7) the clavicles, imitating the form of the furcular bone of birds, united in the median line, and there bearing the process that articulates with the sternum ; (8) the scapulæ elongated, and, at their distal portions, bearing broad processes, which correspond with the coraco-clavicular bones in birds, and are connected with the sternum ; (9) peculiar quadrangular bones lying between these portions of the scapulæ and the median portion of the united clavicles ; (10) in this species the perforated acetabulum ; (11) the marsupial bones ; (12) the long and strong fibulæ, exceeding the tibiæ in length, by processes directed upwards ; (13) in males, the spur attached to the hind foot.

28. 253. Skull of a Duck-mole (*Ornithorynchus paradoxus*).

28. 254. Skeleton of a Condor Vulture (*Sarcorhamphus Condor*).

The following characters of the Accipitres, or Birds of Prey, may be observed in this and other specimens to No. 259 A. (1) the posterior part of the skull projecting more or less behind the occipital foramen ; (2) the general smoothness of the surface of the cranium ; (3) the long and thin ossa communicantia, pterygoid bones, or lower wings of the sphenoid bone ; (4) the developed lateral portions of the ethmoid bone ; (5) the developed lacrymal bones, helping to form the roof of the orbits, and supporting the ossa superciliaria ; (6) the flat and broad palate bones, placed nearly horizontally ; (7) the broad and deep-keeled sternum, without posterior notches, having its anterior median process single and undivided, and two round small openings in its posterior part ; (8) in the diurnal species, the furcula with its branches widely divaricated and arched ; (9) the large and strong humeri ; (10) the very long radii and ulnæ ; (10)

the ossified pubo-ischiadic symphysis; (11) the ossa pubis converging behind their union with the ischia; (12) the femora (in the diurnal species) having air cavities.

28. 255. Skull of a King Vulture (*Vultur Papa*).

28. 256. Sections of the Skull of a Vulture (*Vultur barbatus*), marked according to the description of the cranial vertebræ.

28. 257. Skeleton of a Hen Harrier (*Circus cyaneus*).

28. 258. Skeleton of a Sparrow-Hawk (*Accipiter fringillarius*).

28. 259. Skeleton of a Falcon.

28. 259 A. Sections of the Skull of a Wood Owl (*Strix Aluco*). They show the remarkable elevation of the anterior part of the cranium, produced by the large air cavities in the diploe, especially of the nasal, frontal, and parietal bones.

28. 260. Skeleton of a Jack-Daw (*Corvus Monedula*).

28. 261. Skeleton of a Magpie (*Corvus Pica*).

The two preceding specimens may illustrate the characters of the skeletons of most of the Passeres; namely:—(1) the projection of the posterior part of the skull behind the occipital foramen and its general smoothness; (2) the long and slender pterygoid bones; (3) the palatine bones narrow and wide apart; (4) a large opening in the posterior part of the lower jaw on each side; (5) the sternum having its anterior median process bifurcate, and its posterior border deeply notched on each side; (6) a double obturator foramen between the ischium and pubis.

28. 262. Skeleton of a Green Woodpecker (*Picus viridis*).

The following characters of Scansores are illustrated by this and other specimens to No. 264 A:—(1) in the Parrots, the great developement of the posterior, superior, or jugal process of the sphenoid bone, so that in some, as 264, it



completes, with the lacrymal bone, the ring round the orbit; (2) in the same genera, the intermaxillary bone united to the skull by ligament only, and therefore very moveable; (3) the palate bones having their surfaces placed obliquely, or vertically in the parrots, in which also they are very large and broad, and in which no vomer appears; (4) the deep broad lower jaw in the parrots; (5) in the Woodpeckers, and others assisted by their tails in climbing, the body of the last caudal vertebra broad, and bearing a flattened concave plate beneath it; (6) the sternum generally small, and doubly notched on each side of its posterior border; (7) a single wide obturator foramen.

28. 262A. Skeleton of a Cuckoo (*Cuculus canorus*).

28. 262B. Sections of the Skull of an Hornbill (*Buceros*).

It presents a very remarkable example of the formation of air cavities in the bones, all the cranial and maxillary bones (like nearly all the rest of the bones of the skeleton of this bird), being internally intersected by slender osseous filaments and lamellæ, which in the recent state supported the membranes of air-cells communicating with the lungs. The maxillary and nasal bones especially are as if inflated with air. The short and strong zygomatic or jugal arch, and the tubular form of the united palatine bones and vomer, may be also observed in this skull.

28. 263. Skeleton of a Parrot (*Psittacus*).

Presented by W. S. Ward, Esq.

28. 264. Skull of a Macaw (*Macrocerus*).

28. 264A. Skull of a small Parrot.

28. 265. Skeleton of a tame Pigeon (*Columba Œnas*).

28. 266. Skeleton of a Silver Pheasant (*Phasianus nycthemerus*).

Presented by Benjamin Barrow, Esq.



The following characters of Gallinæ are illustrated by this and the preceding specimen:—(1) the long jugal process from the sphenoid bone, uniting, or nearly uniting, with one from the temporal bone, so as to form a foramen or deep notch; (2) the short and thick pterygoid bones; (3) the small intermaxillary bones; (4) the deeply excavated nasal bones; (5) the small lacrymal bones; (6) the narrow palatine bones; (7) the vomer not distinct; (8) a process directed backwards from each angle of the lower jaw, the angular bone being elongated backwards; (9) the deeply-keeled sternum (especially in the Pigeons), and its very deep lateral or posterior notches; (10) the slender furcula, with, generally, a flat process at its angle.

28. 267. Skeleton of an Emeu (*Casuarias Emeu*).

The characters of the *Cursores* or *Struthionidæ*, illustrated by this and the next specimen, are as follows:—(1) the union by suture between the palatine bones and the pterygoid or inferior alæ of the sphenoid; (2) in the Ostrich, small lateral articulating surfaces on the atlas, in addition to its central articulating cavity; (3) the very long sacrum; (4) the absence of any appended process or plate on the last caudal vertebra; (5) in this species, four anterior pairs of false ribs, *i. e.*, on each side, in front of the first rib that is connected with the sternum, the next succeeding four pleurapophyses are of much larger size, and more like thoracic ribs than their homologues connected with the cervical vertebræ are; (6) the appendages of the ribs small, and united with them by moveable articulations; in this species not present in all the ribs; (7) two pairs of posterior false ribs; (8) the sternum short, broad, concave, and without a keel; (9) the furcula absent, or, as in this species, rudimental; (10) the very small and rudimental anterior extremities, wanting, in this species, the carpal bones; (11) in the Ostrich, the pubic bones united by symphysis; (12) the extreme developement of the hinder extremities.

28. 268. The greater part of the Bones of an Ostrich (*Struthio Camelus*).

28. 269. Skeleton of a Stork (*Ciconia alba*). The chief characters of the skeletons of Grallæ, or Wading Birds, are shown in this and the following specimens to 272 B; namely (1) in many species, the hollowed and grooved palatine bones, and a ligamentous union of the pterygoid bones with the body of the sphenoid; (2) in general, a firm ligamentous or osseous union of the furcula with the keel of the sternum; (3) in general, also, the ossa pubis divergent; (4) the great length and slenderness of the tibiæ, and, more especially, of the tarso-metatarsal bones.

28. 270. Skull of a gigantic Crane or Adjutant (*Ciconia Argala*).

28. 270 A. Skull of a Heron (*Ardea cinerea*).

Presented by A. Clifton, Esq.

28. 271. Skull of an American Crane (*Mycteria Americana*). The partition between the orbits, formed by the ethmoid bone, is here completely osseous, while in the preceding specimen it appears wanting, a large aperture existing which was closed by membrane.

Presented by Arnold Henry, Esq.

28. 271 A. Skull of a Spoon-bill (*Platalea leucorodia*).

28. 272. Skeleton of a Woodcock (*Scolopax rusticola*). The characters of the bones of this skeleton indicate that most of them contain marrow, not air; this is especially seen in the yellowness and greasiness of the wing-bones; the same character is usual in the smaller wading birds.

28. 272 A. Skeleton of a Snipe (*Scolopax Gallinago*). The occipital foramen lies far forwards, and, as in some others of the order, the upper portion of the occipital bone has two foramina or fontanelles.

28. 272 B. Skeleton of a Ruff (*Tringa pugnax*).

28. 273. Skeleton of an Albatross (*Diomedea exulans*).

28. 273 A. Skull of an Albatross.

28. 273 B. Sections of the Skull of an Albatross.

28. 274. Skeleton of a common Tern (*Sterna Hirundo*). Most of its bones are greasy, containing marrow.

28. 274 A. Skull of a gigantic Petrel (*Procellaria*).

28. 275. Skeleton of a Cormorant or Shag (*Phalacrocorax Carbo*).

28. 275 A. Skull of a Cormorant.

28. 276. Skeleton of a Razor-bill (*Alca torda*). The great length of the sternum and the backward elongation of its middle portion may be observed.

28. 277. Skeleton of a common Duck (*Anas Boschas*).

The chief characters of the Palmipedes or Natatores may be illustrated in this and in other specimens from 273 to 283 :—(1) the nearly vertical occipital foramen ; (2) in many, *e.g.*, in 274, 275, strong ridges for the attachment of muscles on the occipital bone ; in some, as the Duck, a fontanelle in it ; and, in the Cormorant, 275, a long bone attached to it by ligament, and projecting straight backwards ; (3) in many species, as the Albatross and Tern, deep concave depressions or grooves on the frontal bone, for the lodgment of nasal glands ; (4) the lacrymal bones large, and reaching, or nearly reaching, to the jugal arch ; (5) the vomer large ; (6) an elongated or double obturator foramen ; (7) the phalanges of the feet long and large.

28. 277 A. The articulated Bones of the Wing of a Teal (*Anas Crecca*).

28. 278. Skeleton of a tame Swan (*Cygnus Olor*). The great

number of vertebræ, twenty-three cervical and eleven dorsal, may be here noticed.

Presented by W. B. Hurle, Esq.

28. 278 A. Four Cervical Vertebræ of a tame Swan. The articular surfaces of their bodies are convex in one direction and concave in the other ; so that their articulation resembles, and equals in mobility, that of the human os trapezium and metacarpal bone of the thumb.
28. 278 B. Sections of Seven Cervical Vertebræ of a Swan, showing the widening of the spinal canal opposite each articulation.
28. 279. Skull of a tame Swan (*Cygnus Olor*).
28. 280. Skull of a wild or whistling Swan (*Cygnus ferus*).
28. 281. Sternum, with the Trachea, of a whistling Swan. The trachea passes between the branches of the furcula, and then between the two plates of the keel of the sternum, between which it extends through the greater part of the length of the keel. Then suddenly bending on itself, it passes forwards, and, emerging from the keel of the sternum, it ascends between the branches of the furcula, curved here for its passage, and bends backwards over the anterior border of the sternum.
28. 282. Pelvis of the same Swan.
28. 283. Skull of a Black Swan (*Cygnus atratus*).
28. 284. Skeleton, with the Carapace and Plastron of a Tortoise (*Testudo concentrica*). The chief characters of the skeletons of the Chelonia, illustrated by this and the succeeding specimens to No. 293, are as follows\* :—(1) the backward

\* The peculiarities of the skull in this and the following orders may be best studied in the disarticulated specimens, Nos. 21 to 25.



extension of the occipital spine (supra-occipital); (2) the broad and short body of the sphenoid bone; (3) the large pterygoid bones; (4) the broad and deeply concave tympanic bone (os quadratum); (5) two comparatively large parietal bones, and two small frontal bones, severally united by suture; (6) large malar or jugal bones; (7) the vomer single; (8) the intermaxillary bones double; (9) the lower jaw having its two halves firmly anchylosed, and, like the upper jaw, toothless; (10) the cervical vertebræ freely moveable, allowing great retraction of the neck; (11) the dorsal vertebræ, ribs, and sternum, generally, as described at p. 107-8; (12) the scapula, long, narrow, tapering, continuous with the large acromion, or anterior clavicle, and united by ligament with the larger and expanded coracoid bone, or posterior clavicle, the whole scapular arch being included within the thorax; (13) the humerus arched backwards; (14) the radius placed internal and posterior to the ulna; (15) the phalanges of the anterior extremities, in the marine species, long and large; in the terrestrial, very short; (16) the pelvis, like the scapular arches, included within the thorax; (17) the ilium, ischium, and os pubis meeting in the formation of the acetabulum, where they are united by ligament; (18) the ischia, as well as the ossa pubis, having a symphysis, and the obturator foramen between them partitioned by a ligamentous cord; (19) the femur strongly curved.

28. 285. Skull of a Turtle (*Chelonia Mydas*).

28. 286. Vertical antero-posterior sections of a Turtle's Skull.

28. 287. The separate Bones of the Skull of a Turtle, marked according to the description of the cranial vertebræ.

28. 288. The Plastron and Carapace of a Tortoise, with its Shells.

28. 289. Pelvis of a Turtle.

Presented by W. J. Bayntin, Esq.



28. 290. A similar specimen.

28. 291. The Scapula and Coracoid Bone of a Turtle.

28. 292. The Articulated Bones of the anterior extremity of a Turtle.

28. 293. Separate Bones of a small Tortoise.

28. 294. Skeleton of a West Indian Crocodile (*Crocodilus acutus*).

The following characters of the Sauria may be observed in this and the following specimens to No. 300; (1) the body of the sphenoid bone small, continuous anteriorly with a styloid, or a broad vertically placed process (pre-sphenoid), having its extremity free; (2) the pterygoid bones, in the crocodiles, broad, united by suture in the middle line, beneath the sphenoid and pre-sphenoid; (3) the post-frontals columnar, and, through the medium of the ali-sphenoid bones, supporting the parietal on the outer margins of the pterygoid; (4) the tympanic narrow and deeply hollowed; (5) the parietal usually single and small; (6) the frontal, in some single, in some double, in all small; (7) the malar, in the crocodiles, large and long; (8) dermal supra-orbitals present; (9) superior maxillary bones large, long, and bearing, with the intermaxillary, conical teeth; (10) the two halves of the lower jaw united by close symphysis, each half consisting of six pieces; (11) the bodies of the vertebræ generally concave anteriorly, and convex posteriorly; (12) the cervical vertebræ few, and in the crocodiles and some others bearing short ribs (see No. 10); (13) the sacrum usually formed of two vertebræ, to the transverse processes of which the ilia are attached; (14) the caudal vertebræ numerous, most of them having hæmapophyses and hæmal (inferior) spines, inclosing an hæmal canal for the aorta; (15) several of the ribs not connected with the sternum, and in the crocodiles certain abdominal ribs, which are not connected with the vertebræ (see No. 298).

28. 295. Separated Bones of the Skull of an East Indian Crocodile

(*Crocodilus biporcatus*), marked according to the descriptions of the cranial vertebræ.

28. 296. Skull of a Crocodile (*Crocodilus paludinosus*).

28. 297. Separated Bones of the Skull of an Alligator (*Alligator Lucius*).

28. 298. Abdominal Ribs of an Alligator.

28. 299. Skeleton of a Green Lizard (*Zootoca vivipara*.)

28. 300. Skeleton of a Chameleon (*Chamæleo vulgaris*). Long processes extend upwards and backwards from the parietal and temporal bones, and unite in a kind of pyramidal framework. The sternum is a short broad cartilage, and the costal cartilages coalesce in the middle line.

38. 300 A. Cervical Vertebra of a Plesiosaurus.

28. 300 B. Cervical Vertebra of a Plesiosaurus dolichodeirus.

28. 300 c. Cervical Vertebra of a Pliosaurus.

28. 300 D. Vertebra of an Iguanodon.

28. 301. Skeleton of a Boa (*Python Sebæ*). The following chief characters of Ophidia may be studied in it and the two following specimens; (1) the body of the sphenoid bone (basi-sphenoid) elongated and narrow; (2) the pre-sphenoid extending forwards in a slender process; (3) the pterygoid bones long, thin, and wide apart, united by suture internally with the palatine bones, externally with the superior maxillary, and posteriorly with the tympanic, and frequently bearing teeth; (4) the mastoid bones elongated; (5) the tympanic long and narrow, articulated moveably with the mastoid; (6) the parietal and frontal bones small; (7) the palatine bones very long, and often bearing teeth; (8) the inter-maxillary bones small; (9) the superior maxillary, in the

ordinary serpents, long ; but in the venomous, short and thick, and bearing the poison-fangs ; (10) the two halves of the lower jaw connected by extensile ligament ; (11) the vertebræ short, with many mutual articulations (see No. 13) and very numerous ; in this specimen, 34† ; (12) the ribs connected with the transverse processes of the greater number of the vertebræ ; (13) no appearance of a sternum, or of anterior extremities ; (14) rudiments of a pelvis and of posterior extremities in a pair of elongated bones, or series of small bones, beneath the skin, near the anus ; the last of this series of bones supporting, in this specimen, a nail.

28. 302. Skeleton of a young Boa (*Python Tigris*).

28. 303. Skeleton of a common Snake (*Coluber Natrix*).

28. 304. Skeleton of a Jersey Toad (*Bufo vulgaris*). In this and the next following three specimens, the chief characters of the Tail-less or Anourous Batrachia may be observed, including (1) the double articular condyles of the occipital bone ; (2) the lateral occipital bones, or exoccipitals, ascending and converging so as to leave a wide open space between them and the atlas ; (3) the sphenoid bone large and cruciform ; (4) the position of the greater wings of the sphenoid filled by membrane ; (5) the inferior wings, or pterygoid bones, having each one process directed outwards, and united with the supra-maxillary, palatal, and nasal bones, and another united with the tympanic bone ; (6) frontal bones absent or anchylosed with the parietal ; (7) superior maxillary and inter-maxillary bones large and widely arched ; (8) the vertebræ of the trunk very few—in this species only eight ; (9) a single sacral vertebra, with very broad transverse processes ; (10) the coccygeal vertebræ united in a single bone ; (11) ribs not present, or, in a few species, small and rudimental ; (12) sternum short and expanded posteriorly, or in two pieces, articulating respectively with the clavicles and the coracoid bones (anterior and posterior clavicles) ; (13) the place of

scapula occupied by two bones, supra-scapula and scapula, of which the last, with the coracoid and clavicle, forms the cavity for articulation with the humerus ; (14) ilia very long and narrow, coalescing posteriorly with the small ischiatic and pubic bones, and forming with them a thin disk perforated by the acetabula ; (15) the radius and ulna, and the tibia and fibula, united, but presenting grooves marking their division ; (16) os calcis and astragalus long, and resembling a radius and ulna ; (17) phalanges elongated and numerous.

28. 305. Skeleton of a Frog (*Rana temporaria*).

28. 306. A similar specimen.

28. 307. Articulated Bones of the anterior extremities of a Frog.

28. 308. Articulated Bones of the hinder extremities of a Frog.

28. 309. Skeleton of a Proteus (*Proteus anguinus*). As an example of the Perennibranchiate Ichthyoid Reptiles, the following characters may be noticed in this Skeleton:—(1) the exoccipital (lateral occipital) bones united by synchondrosis with the first cervical vertebra : (2) the tympanic bone consisting of two pieces ; (3) two distinct frontal bones ; (4) the vertebræ numerous—in this specimen fifty-five,—having their bodies elongated, and conically excavated at both ends, like those of fishes ; (5) seven or eight vertebræ of the trunk supporting ribs ; but they are not shown in this specimen ; (6) the scapula partly cartilaginous ; (7) the radius and ulna separate ; (8) the fore-foot having only three digits ; (9) the ilium a small slender bone attached to the single sacral vertebra ; (10) the pubis and ischium blended in a broad plate inferiorly ; (11) tibia and fibula united ; (12) tarsus cartilaginous.

The following specimens of the Skeletons of Fishes being scarcely sufficient for the illustration of the diversities of structure in the several orders of the class, and the principal characters of the



cranial and spinal vertebræ and their appendages being illustrated by specimens already described, it may be enough to make the following references to those exemplifications of the general structures of the whole class which are offered in the foregoing and next succeeding specimens :—(1) The general construction of the skull of osseous Fishes is shown in No. 21, in which the bones of the Cod's head are disarticulated and re-arranged. (2) The general characters of their spinal vertebræ is shown in Nos. 1 to 9; and, especially in Nos. 5 and 6, the connexion of the spines of the vertebræ with those of the dermo-skeleton is shown; and in Nos. 317, &c., the bending of the parapophyses or transverse processes of the posterior vertebræ downwards and inwards, to enclose the hæmal canal. (3) The usual connexion of the ribs with the parapophyses alone is shown in Nos. 7, 317, &c. (4) The coalescence of the caudal vertebræ and their spines in one fan-shaped bone, in No. 9, and others; (5) and the appendages of the ribs, which have been named accessory ribs, are shown in No. 6 and others. (6) The construction of the anterior extremity, or pectoral fin, is described with No. 25, regarding it as the appendage of the occipital vertebræ; it is, also, especially well displayed in Nos. 313 and in 318. (7) The construction of the pelvis and posterior extremities, as the bones of the ventral fins, is also described in Nos. 313 and 318A.; their several positions being illustrated as 'abdominal,' in 314-5; 'thoracic,' in 310-1; 'jugular,' in 313, 319; their absence in the 'apodal' fish, in 326A.

28. 310. Skeleton of a Gurnard (*Trigla Lyra*). The opercular series of bones are large, and the union of the pre-opercular with the greatly developed sub-orbital scale-bones gives the peculiar character of the 'mail-cheeked' fishes. The lowest three rays of the pectoral fin are detached from the rest; the fin which they support is believed to be an organ for tact; all the other pectoral fin-rays are of great length.

28. 310A. A Flying Gurnard (*Dactylopterus*), dried. The great expanse of the pectoral fins on the long and strong fin-rays imitates the structure, and gives, in some measure, the power of the true Flying Fish (*Exocætus*). The lowest pectoral fin-rays are detached, as in the preceding species.



28. 311. Skeleton of a Dolphin (*Coryphæna Hippurus*). The supra-occipital and frontal bones bear a high elevated crest or spine, extending over nearly the whole length of the upper part of the skull.
28. 311A. Skeleton of a Dory (*Zeus Faber*). In its general form it presents an example of the 'deep' or compressed fish. As in other fish with protractile snouts, the nasal portions of the premaxillary bones are very long, and slide on a groove on the upper part of the skull, extending nearly to the supra-occipital bone. The maxillary or descending portions of the premaxillary bones are attached by ligament to the maxillary bones; and these being similarly attached to the lower jaw, the jaws are both and altogether protruded by the single action which slides forwards the nasal portions of the premaxillary bones. In the lower jaw, a large aperture exists between the dentary and articular bones.
28. 312. Head of a Wolf-fish (*Anarrhicas Lupus*). It is chiefly remarkable for the strength of the bones that support its oral teeth, namely, the intermaxillary, premandibular, and palatine bones and the vomer, to which, also, are adapted the bones giving attachment to muscles of mastication. The dentigerous bones have strongly developed alveolar processes.
28. 313. Skeleton of a Sea-Angler (*Lophius piscatorius*). The fish derives its name from the three slender dermal spines which are moveably articulated with the supra-occipital and frontal bones, and which, covered with integument, and bearing vascular processes at their ends, serve as bait by which smaller fish are attracted to the neighbourhood of its wide-expanded jaws. The vertebral column is of very simple construction; the abdominal vertebræ have no ribs, and only rudiments of parapophyses. 'The bodies of these vertebræ interlock at their lower and lateral part by a short angular process fitting into a notch in the next vertebra; the lower border of this notch represents the parapophysis in other fishes; it is obsolete in the anterior abdominal vertebræ; begins to appear

about the middle ones; shows its true character in the tenth; and elongates, bending downwards, backwards, and inwards, to coalesce with its fellow, and form the hæmal arch, at the twelfth or thirteenth vertebra, from which the hæmal spine is developed.'—(Owen, 'Lectures on the Comparative Anatomy and Physiology of the Vertebrate Animals,' part i. p. 62.) Only three dermal spines are placed above the abdominal vertebræ. The opercular bone is very long and large, and bears a slender fin-ray near its articulation with the epitympanic. Extremely long branchiostegal or gill-cover rays, also, are borne on the cerato-hyal bones, and serve to support a large pouch-like membrane on each side of the head. In the pectoral fins, the two carpal bones are peculiarly long, and in shape resemble a radius and ulna. The coracoid bone is of very large size, and the whole member so strong that it may be used effectively in springing upon dry ground. The ventral or pelvic fin is suspended from the coracoid bone; each pelvic bone having a cylindric stem, representing, probably, an ilium, and a portion which bends inwards towards a kind of symphysis pubis. The six fin-rays diverge from the angle of junction of the two bones.

28. 313A. A small *Lophius*, dried.

28. 314. Skeleton of a Carp (*Cyprinus Carpio*). A broad plate is attached to the inferior surface of the basi-occipital bone, and bears a tooth for opposition to the movements of the pharyngeal teeth. The jaws are edentulous.

28. 315. Skeleton of a Tench (*Tinca vulgaris*). The same characters of the occipital and maxillary bones are shown as in the preceding specimen; and as in it, but more plainly shown, the suborbital bony scales are largely developed.

28. 316. Skeleton of a Spotted Wrasse (*Labrus trimaculatus*). The pharyngeal bones, with their free surfaces covered with strong crushing teeth, are very large and strong, as in all the Labroid family of fishes.

28. 317. Skeleton of a Cod (*Gadus Morrhua*). The head is described in No. 21. In the abdominal vertebræ, the very long and broad parapophyses (transverse processes) may be observed ; they support the air bladder.
28. 318. The Bones of the left side of the scapular arch, and of the left anterior extremity, or pectoral fin, of a Cod (*Gadus Morrhua*). Their connexion with the occipital vertebra is illustrated by No. 21. They consist of, (50) the bifurcate supra-scapula, (51) the ensiform scapula, (52) the falciform coracoid. These three bones, articulated in a semilunar series, form one side of the scapular arch, which is completed by the ligamentous union of the apices of the two coracoids. To the upper and inner part of the coracoid is attached a slender bone, the epicoracoid (58); and, to a portion of the anterior margin of the coracoid bent inwards, are attached two thin bones, the ulna and radius (54, 55); no homologue of the humerus existing here. The ulna situated above, and the radius below, have an interosseous space between them. With their posterior border are connected four carpal bones (56), placed in a linear series, and bearing, with moveable articulations, the twenty fin-rays, representing the metacarpus and phalanges.
28. 318A. The Bones of the posterior extremity, or ventral fin, of a Cod (*Gadus Morrhua*); from the left side. A single bone, of somewhat triangular form, and bifurcate, represents the lower half of the inverted or pelvic hæmal arch; and to its base or outer border are suspended the six fin-rays that represent the metatarsus and phalanges. No other homologues of the bones of the hinder extremity of higher animals exist.
28. 319. Skeleton of a Plaice (*Platessa vulgaris*). The characters of its vertebræ, and of their appended spines, are illustrated by the description of those of the Turbot (No. 5). In the ordinary posture of the flat fishes such as this, the neural elements of the vertebræ, which in other fish are superior, are directed to the left side of the spine, and the hæmal or inferior elements to the right side. There is a corresponding disposition of the bones of the head, but it is combined with

a want of symmetry, by means of which both orbits are placed in the superior aspect of the head. The want of symmetry is due, chiefly, to the pre-sphenoid bone being twisted upwards to the neural or left side of the skull; and with this there is an inequality of size in some of the corresponding bones of the skull, the left parietal being smaller than the right, and the single frontal having its right side, as it were, scooped out to form the boundary of the right orbit.

28. 320. The separated Bones of the Head, and the anterior five vertebræ of a Tobacco-pipe Fish (*Fistularia tabaccaria*). The anterior four vertebræ are elongated, and their bodies, neurapophyses, neural spines, and parapophyses are thin and laminar, and anchylosed, so as to present a remarkable likeness to cranial vertebræ. The fifth vertebra of the trunk is described in No. 8; the first bears anteriorly a single concave surface, with which a corresponding convexity on the basi-occipital bone is articulated. All the bones of the head are remarkably lengthened, especially the vomer, the pterygoid, and the components of the tympanic portion of the tympano-mandibular arch.

28. 321. Skeleton of a Skate (*Raia Batis*). It presents the flat and broad skull usual in this family, the incompleteness of its upper part where it is closed by membrane, and the long pyramidal rostrum at its anterior part. Cartilages articulated with this prolongation connect it with the anterior part of the lateral fin-rays. These fin-rays, upwards of a hundred in number on each side, extend along the lateral margin of the fish, and are closely connected with the coraco-scapular arch, which forms a kind of girdle suspended from the spines of the anterior abdominal vertebræ, and extending round the fore part of the body. The coracoid and scapula expand at their outer extremities, and are connected at three points, to each of which is attached a cartilage on which are set the fin-rays. The anterior cartilage is connected with that of the rostrum; the posterior, with the ventral fin. In the ventral fin the rays are not attached directly to the extremities of the pubic arch, but on each



side to two intermediate cartilages, which may represent a tarsus.

28. 322. Portion of the Vertebral Column of a Shark (*Carcharias*).  
(See Nos. 1 to 4 in this Series.)

28. 323. Portion of the Vertebral Column of a small Galeus.

28. 324. A similar specimen.

28. 325. The Head of a Sturgeon (*Accipenser Sturio*), dried.

28. 326. Skull of a Bony Gar-fish (*Lepidosteus osseus*). Three rows of sharp conical teeth, of different sizes, are set on each of the elongated jaws. The premaxillary and maxillary bones are divided into many pieces. The basi-occipital bone bears two plates, which enclose the epencephalon and support the ex-occipital bones; the supra-occipital is double. Behind the occiput some of the bony 'ganoid' scales remain, which, occurring in numerous species of extinct fishes, now characterize this and *Polypterus* as the only two genera of extant osseous fishes in which they are found.

28. 326 A. Skeleton of an Eel (*Anguilla*). The proportionally large number of vertebræ; their low neural spines; their generally small size; and their distinctness, even in the tail, may be observed. Ventral fins are absent, as in the apodal fish generally. The feebly developed scapular arch is loosely suspended behind the opercular bones.

28. 327. The anterior part of the cartilaginous Skeleton of a Lamprey (*Petromyzon marinus*). Besides the general construction of the skull, and the arrangement of the horn-like teeth attached to the circular lips, it shows especially that which Müller has termed 'the cartilaginous basket of the branchiæ.' 'Seven cartilaginous processes, analogous to pleurapophyses, but homologous with epibranchials, come off from a cartilaginous tract on both sides of the chorda dorsalis, one below each alternate pleurapophysis. After a short course out-



wards and downwards, each of these processes divides into three branches ; one passing forwards, one backwards, and the intermediate one (cerato-branchial), or continuation of the quasi-rib, downwards. The anterior and posterior processes of contiguous ribs coalesce and form arches above the branchial apertures, which are circumscribed by similar arches formed below by analogous arches there given-off from the cerato-branchial. This (cerato-branchial) then descends, bends inwards, dilates, and is perforated ; then contracts and joins a broad and long cartilaginous hypo-branchial, or quasi-sternum, typifying by its double row of perforations that complex bone in birds. The anterior branches of the first cerato-branchial unite to form a vertical arch convex forwards ; the posterior pair expand and unite to form the perforated cartilaginous case lined by the pericardium, which contains the heart.'—(Owen, 'Lectures on the Comparative Anatomy and Physiology of the Vertebrate Animals,' part i. p. 52.

## SERIES XXIX.

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### THE ARTICULATIONS OF THE SKELETON.

29. 1. Portion of a Spine, from the lumbar region, showing the articulations of the vertebræ, and especially the oblique decussating tendinous fibres composing the outer layers of the intervertebral fibro-cartilages. The superficial layers of fibres are removed from between the two upper vertebræ.
29. 2. Part of the base of a Skull, with the superior cervical Vertebræ. The spinal canal is laid-open from behind; the occipito-axoidean ligament is turned-down, exposing the transverse ligament of the atlas, and the three odontoid ligaments, two lateral and one median, proceeding from the odontoid process to the occipital bone.
29. 3. Sections of two Pubic Bones and their Symphysis. Bristles are passed into a narrow cavity in the middle of the symphysis.
- From a woman who died shortly after parturition.
29. 4. A similar specimen, with the cavity openly displayed.
29. 5. A similar specimen. Considerable mobility existed between the two bones; and the sacro-iliac symphyses were similarly, though less, loosened.
29. 6. A Temporo-maxillary Articulation, with its interarticular

fibrous cartilage. Two completely distinct synovial cavities are separated by the cartilage.

29. 6 A. A preparation of the chief Ligaments of the Lower Jaw ; namely, the internal lateral, pterygo-maxillary, stylo-maxillary, and stylo-hyoid.
29. 7. An Elbow-joint. Bristles are passed under the lateral ligaments. The orbicular ligament is divided in front and reflected in two portions. The tendon of the biceps is left attached to the tubercle of the radius : just below it, the oblique ligament passes from the radius to the ulna.
29. 8. A Wrist-joint, in which are shown the triangular fibro-cartilage at the end of the ulna, the posterior, external lateral, and annular ligaments, and the synovial cavities between the carpal and metacarpal bones.
29. 9. A Hip-joint, with the synovial and fibrous layers of its capsule separated.
29. 10. A Knee-joint, with the crucial ligaments exposed and dissected.
29. 11. A Knee-joint, with the semilunar cartilages, the inferior attachments of the crucial ligaments, and part of the bursa beneath the ligament of the patella.
29. 12. Part of the Synovial Membrane round a Patella, with its blood-vessels minutely injected.
29. 13. Part of a Tarsus, showing the ligaments connecting the os calcis with the os naviculare and os cuboides.
29. 14. A Horse's Foot, with its principal ligaments and tendons dried.
29. 15. A similar specimen, in which the blood-vessels are injected.

## SERIES XXX.

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### THE TESTICLE, AND ITS COVERINGS AND DUCT.

30. 1. A Testicle and Spermatic Cord, to show their external form and relations, together with the arrangement of the tunica vaginalis testis, and the deep pouch into which it is reflected between the body of the testicle and the epididymis.
30. 2. A Testicle, with the spermatic cord and surrounding tissues. A layer of fibro-cellular tissue is opened and turned aside, which invests or forms the 'cellular sheath' of the whole length of the spermatic cord and the tunica vaginalis testis. The tunica vaginalis is laid open, and the constituents of the spermatic cord are set apart.
30. 3. A Testicle, of which (after cutting open the tunica albuginea), the secreting tubules have been unfolded and separated. Many of the tubules are thus shown, singly and in bundles, extending through long distances, finely undulating, of uniform diameter, and without branching or anastomosis. At the lower part of the preparation many of the tubules appear to form loops.
30. 4. A Testicle, dried after the injection of mercury through the vas deferens. The mercury passing through the vas deferens has filled nearly the whole of the fine convoluted tube forming the epididymis, and a portion of the tubules in the body of the testicle.

30. 5. A similar specimen, showing more plainly the tubules in the Rete Testis.

Prepared and presented by Holmes Coote, Esq.

30. 6. A similar specimen.

30. 7. A similar specimen. The spermatic veins are injected with wax.

30. 8. A similar specimen.

30. 9. A Testicle, dried after injecting with mercury the vas deferens and tubules of the epididymis, and the spermatic artery, veins and lymphatics.

Prepared and presented by John Havers, Esq.

30. 10. A similar specimen.

30. 11. A Vas Deferens, with its fine tubular continuation in the epididymis filled with mercury, unravelled and dried.

30. 12. A similar specimen.

30. 13. Spermatic Plexus of Veins injected with wax and dried.

30. 14. Spermatic, Deferential and Cremasteric Arteries, injected and dried with the parts in which their chief branches are distributed.

30. 15. Two similar preparations of Spermatic Arteries.

30. 16. The Testicles and Penis of a Dog. The open tubular communications between the cavities of the tunicae vaginales and that of the peritoneum are displayed.



## SERIES XXXI.

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### ACCESSORY ORGANS OF GENERATION IN THE MALE.

Vesiculæ seminales, 1 to 5.

Prostate and other accessory glands, 6 to 10.

Urethra and Penis, 11 to 24.

Various preparations of genital and urinary organs, and the parts related to them,  
25 to 32.

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31. 1. Vesiculæ Seminales, with the terminations of the Vasa Deferentia, dried after being filled with mercury. The preparation shows, especially, the outer form of the vesiculæ, the acutely angular junction of their ducts with the vasa deferentia, the small and gradually decreasing size of the common or ejaculatory ducts, and the minutely reticular or sacculated construction of the walls of the vesiculæ.
31. 2. A vertical section of a similar preparation. The closely convoluted and branching tube, of which each vesicula is formed, appears, in section, like a many-chambered and sacculated pouch.
31. 3. Sections of Vesiculæ Seminales and Vasa Deferentia. The mucous membrane of the vasa deferentia has a sacculated arrangement, and leaves only a very fine canal within its projecting folds. A similar structure with, apparently,

finer reticulations exists in the mucous membrane of the vesiculæ seminales.

31. 4. Vesicula Seminalis and the termination of the Vas Deferens, dried after injection with wax.
31. 5. The Genital Organs, together with the Bladder, Kidneys, and other adjacent parts, of a male Hedgehog (*Erinaceus Europæus*). The vesiculæ seminales are of large size, larger than those of man; and their ducts open into the urethra separate from those of the testicles. The large prostate and Cowperian glands are also shown.
31. 6. A Prostate Gland, with the adjacent parts. The vesiculæ seminales and vasa deferentia are dissected from the posterior part of the urinary bladder, and turned downwards, so as to show the posterior or middle lobe of the prostate gland.
31. 7. A vertical antero-posterior section of a Prostate Gland, showing its relations to the portion of the urethra round which it is placed, and the gradual decrease of the thickness of the layer of muscular fibres as one traces it from the neck of the bladder along the prostatic part of the urethra.
31. 8. Prostate Glands from Children of the ages of four and ten years.
31. 9. A Penis, with the Prostate and Cowper's Glands. The three lobes of the prostate gland are shown from behind, and bristles are passed along the ejaculatory ducts, traversing the prostate into the urethra at the sides of the caput gallinaginis. Other bristles are passed into the urethra through the long ducts of Cowper's glands.
31. 10. An Urethra laid open, and with bristles passed into the lacunæ or orifices of gland-ducts on its walls. Fifty-three lacunæ are thus indicated; the greater part of them being on the superior wall of the spongy portion of the urethra,

and on the inferior wall of its bulbous and membranous portions.

31. 11. Cast in wax of an Urethra, to show its average length, and the proportionate sizes of its several parts.
31. 12. An Urethra, with the blood-vessels of its corpus spongiosum injected, and its canal laid open from below.
31. 13. Transverse section of a Penis, after minute injection of its blood-vessels. The preparation shows, especially, the forms and relative sizes of the corpora cavernosa penis separated by the fibrous septum, and of the corpus spongiosum surrounding the urethra; the large vessels beneath the integuments on the dorsum of the penis; and the general characters of the erectile tissue and its fibrous covering, are also shown.
31. 14. Vertical section through a Glans Penis, showing the continuity of its spongy or erectile tissue with that of the anterior part of the corpus spongiosum urethræ, the strong fibrous covering that separates these from the corpus cavernosum, and the general form of the anterior part of the urethra.
31. 15. A Penis, dried after injecting the veins of the glans and corpus spongiosum urethræ with yellow wax, and those of the corpora cavernosa with red wax. In both parts, the structure of the erectile tissue appears almost entirely composed of tortuous, branching, and freely communicating veins. The veins of the glans and of the anterior part of the corpus spongiosum are collected in a close plexus of large branches, which lie on the dorsum of the penis behind the glans, and which converge and open into the great dorsal vein. A few smaller veins also pass from the median portion of the corpus cavernosum into this great dorsal vein, and into a smaller which lies by its side and parallel with it.

Prepared and presented by Thomas Wormald, Esq.

31. 16. A similar preparation.

31. 17. A corroded injection of the Veins of the Glans Penis, and of the adjacent portion of the corpus spongiosum urethræ.

Prepared and presented by Thomas Wornald, Esq.

31. 18. Sections of Corpora Cavernosa Penis, inflated and dried.
31. 19. A Penis, from which, on one side, the erectile tissue of the corpus cavernosum is removed, and the internal surface of its fibrous sheath or investment is displayed.
31. 20. A Penis, in which, by similar removal of the erectile tissue on both sides, the fibrous septum (septum pectiniforme) of the corpora cavernosa is shown. It is chiefly constructed of strong vertical bands of fibrous tissue, the apertures between which permit the passage of only small blood-vessels from one of the corpora cavernosa to the other.
31. 21. Two specimens of the Penis of the Dog. In one, the veins of the glans and corpus spongiosum are injected: in the other, a portion of the glans is removed to show its interior spongy tissue.
31. 22. Portions of the Penis of a Horse, dried after injection of its arteries and veins with wax. The injection passed from the arteries into the veins, which, thus filled, appear to compose nearly the whole of the erectile tissue.
31. 23. Transverse section of the Penis of a Horse, displaying (from above downwards) the orifices of the divided dorsal veins; the corpus cavernosum invested with a thick fibrous sheath, and intersected with fibrous branching bands: the corpus spongiosum surrounding the urethra; the retractor muscle.
31. 24. Section of the Penis of a Horse, showing the interlacing fibrous and muscular bands in the interior of the corpus cavernosum.
31. 25. Male Genital Organs dried, with the urinary bladder and the front of the pelvis. The veins of the penis and sperma-

tic cords, the vasa deferentia, and the vesiculæ seminales are injected with wax.

31. 26. A similar preparation of a Penis, and of the plexus of great veins at the sides of the prostate gland. The structure of the corpora cavernosa and the arrangement of their arteries are also shown.
31. 27. A similar preparation of the Penis, vesiculæ seminales, vasa deferentia, and urinary bladder.
31. 28. A similar preparation, showing especially the venous plexus at the neck of the bladder.
31. 29. A lateral section of the Bladder and Penis, to illustrate the course of the urethra under the arch of the pubes.
31. 30. The anterior part of a Pelvis, with the bulbous and membranous portions of the urethra shown in their relations to the triangular or sub-pubic ligament.
31. 31. A preparation of the triangular or sub-pubic ligament.
31. 32. A similar preparation dried.



## SERIES XXXII.

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### ORGANS OF GENERATION IN THE FEMALE, IN THE UNIMPREGNATED STATE.

Ovary and Fallopian tube, 1 to 5.

Uterus, ovary, &c. 6 to 12.

External organs, 7, 8, 13.

Ovaries of animals, 14 to 17.

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32. 1. An Ovary, of which the blood-vessels are minutely injected. Its fibrous covering or tunica albuginea presents numerous depressions or cicatrices indicating the former discharge of ova. On section its interior substance or stroma appears highly vascular; and the cavities of many Graafian vesicles or ovisacs are imbedded in it.
32. 2. Two Ovaries, in which the Graafian vesicles, without any apparent change of texture, are large beyond the ordinary limits of health.
32. 3. Ovaries, with the Fallopian tubes or oviducts. Bristles are passed through the tubes, and their fimbriated extremities are displayed in their ordinary relation to the ovaries.
32. 4. A Fallopian Tube, of which the blood-vessels are minutely injected; the canal is laid open, and the fimbriæ are displayed.

32. 5. An Uterus, from a woman who died during menstruation. It appears rather larger than usual; its mucous membrane is finely flocculent, and its vascularity is shown by minute injection.
32. 6. Sections of an Uterus, showing its outer form, the shape of its cavity, and the mingled muscular and fibrous tissues of its walls. Fine injection, impelled into one of the uterine arteries, has filled the small vessels of only the corresponding half of the walls and lining of the uterus; the injection has stopped abruptly at the middle line.
32. 7. Female Genital Organs. The ovaries, Fallopian tubes, uterus and vagina, are suspended in their natural positions, with their blood-vessels injected, and their cavities laid open.
32. 8. Sections of the Pelvic Organs and Perineum of a Woman twenty-five years old, giving a side-view of the organs of generation, and of the rectum and urinary bladder, with their peritoneal coverings.
32. 9. An Uterus, with the Fallopian tubes, ovaries and round ligaments. The lines of reflection of the peritoneum from the anterior and posterior surfaces of the uterus are shown.
32. 10. Internal Organs of Generation, from a girl seventeen years old, who had menstruated only once. They are of very small size, and their surfaces are smooth, but they present no abnormal structure.
32. 11. Internal Organs of Generation from a girl thirteen years old. In one of the ovaries three enlarged Graafian vesicles are filled with a substance which, in the recent state, appeared gelatinous. The length of the neck of the uterus, in proportion to its body, may be observed.
32. 12. A similar specimen, with Graafian vesicles similarly filled; from a girl ten years old.

32. 13. External Organs of Generation, displaying the nymphæ, hymen, clitoris and its prepuce; and, at the back of the preparation, the body and crura of the clitoris, and part of the vagina.

32. 13 A. The Organs of Generation of a female Hedgehog (*Eri-naceus Europæus*).

32. 14. The Ovaries of a Sow.

32. 15. One of the Ovaries and a portion of one of the horns of the Uterus of a Sow, with their blood-vessels minutely injected. Several of the lobes of the ovary are laid open.

32. 16. The Ovaries and Uterus of a Sheep; the uterus is an example of the Uterus bicornis.

The three preceding specimens were presented by Dr. Conquest.

32. 17. The Ovaries, with their clustered distinct ovisacs, the oviducts, and the cloaca of a Turtle.

Presented by George Langstaff, Esq.

## SERIES XXXIII.

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### ORGANS OF GENERATION IN THE FEMALE, DURING OR SHORTLY AFTER PREGNANCY.

Uterus during gestation, 1 to 12.

Uterus after parturition, 13 to 18.

Ovaries with corpora lutea, 19 to 27.

Corresponding parts in animals, 28 to 36.

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33. 1. An Uterus, with the foetus and its membranes, in the fifth month of gestation. The decidua is separated from the interior surface of the uterus, whose laminated muscular structure is shown in the section through its walls. The left ovary contains a corpus luteum, with a large central cavity bounded by a thin opaque white membrane, around which is a layer of yellow substance, nearly a line in thickness.
33. 2. A similar specimen; the foetus is in its natural position with the umbilical cord twisted round its arm.
33. 3. An Uterus, with the foetus and its membranes, *in situ*, at about the sixth month of gestation. The elongated neck of the uterus, its globular body, and its transversely wide external orifice, are here shown. The umbilical cord is twisted round the neck of the foetus.

Presented, with the preceding specimen, by Dr. Conquest.

33. 4. An Uterus, with the foetus and its membranes, at about the seventh month of gestation. A portion of the posterior wall of the uterus being removed, the uterine surface of the placenta is exposed. The head of the foetus is uppermost.
33. 5. A similar preparation of an Uterus, with the foetus in the normal position, at about the eighth month of gestation. The greater part of the uterine surface of the placenta is shown.
33. 6. A similar preparation of the Uterus and its contents in the ninth month of gestation.
33. 7. An Impregnated Uterus inverted, and showing the arrangement of some of its interior muscular fibres; especially of those that form circles around the entrances of the Fallopian tubes.

Presented, with the preceding, by Dr. Conquest.

33. 8. Section of an Uterus, at the full term of gestation, showing its layers of muscular fibres.
33. 9. Section of an Uterus in about the fourth month of gestation. The two layers of the membrana decidua are separated, and a part of the amnion is reflected from the surface of the placenta.
33. 10. A similar specimen.
33. 11. An Uterus, at about the seventh month of gestation, dried after the injection of its principal blood-vessels. The arteries are filled with red wax; the veins, like great sinuses, are filled with yellow wax. Many of the veins pass into communications with those about the vagina and the sides of the bladder; others pass into the broad ligaments.
33. 12. An Impregnated Uterus, dried after the injection of its principal arteries, whose extremely tortuous course is thus shown.



33. 13. The Uterus of a Woman who died a few hours after parturition at the full period. In its size, and the thickness of its walls, it resembles an uterus in the fourth month of gestation. Its interior surface is very rough, especially at the part from which the placenta separated.

33. 14. The Uterus of a Woman who died nearly a fortnight after parturition at the full period. It is rather smaller than that last described.

Presented, with the preceding specimen, by Dr. Conquest.

33. 15. The Uterus of a Woman who died shortly after parturition. It has been dried after the injection of its principal blood-vessels.

33. 16. A similar preparation.

33. 17. A similar preparation of an Uterus, with its veins injected, six weeks after parturition. The uterus appears to have nearly recovered its natural size, but its veins remain, proportionally, very large.

33. 18. An Uterus, with the ovaries and other adjacent parts, from a woman who was supposed to have been impregnated a short time before death. The interior of the uterus is rough from the formation, it was believed, of a *membrana decidua*. A bristle is passed through an aperture on the surface of the left ovary, into a cavity from which, it was presumed, the ovum was discharged, but which has the characters of a complete *corpus luteum*.

33. 19. An Ovary, from a woman who died in the eighth month of gestation. A bristle is passed through an aperture in its fibrous covering, into the cavity of a *corpus luteum*. The cavity is oval, and has two or three short processes extending from it in a stellate manner: it measures nearly two lines in its chief diameter, and is bounded by a very thin white layer. The substance of the *corpus luteum* surrounding this cavity forms a nearly uniform layer about a line and a half in thickness. The minute injection of the blood-vessels

show that this layer is much more vascular than any part of the ovary, and its principal vessels appear to pass in lines converging from its circumference towards its centre.

33. 20. Two Ovaries. In the upper one is a corpus luteum like that last described; but, not having its blood-vessels injected, it presents some trace of its original yellow ochre colour.

33. 21. An Ovary, in which are two well-formed corpora lutea. One is of rather smaller size than the other, has no central cavity, and lies deep in the substance of the ovary, near its attachment to the broad ligament; but, in all general characters, they both resemble the specimens just described.

A single foetus was in the uterus of the woman from whom this ovary was taken. It is to be presumed that two ova were simultaneously discharged, but that only one was impregnated.

33. 22. An Ovary, with a corpus luteum of unusually large size. It is of broadly oval form, measuring about three-fifths of an inch in its chief diameter, and projecting on the surface of the ovary. Its outer surface is lobed and crenate: its layer of yellow substance is about two lines thick; and its cavity is large, flattened, and bounded by a thin, but apparently distinct, layer of soft yellow-ochre substance. No external aperture is visible on the surface of the ovary.

33. 23. An Ovary, with a corpus luteum, of which the boundaries are indistinct, and which presents no appearance of a cavity. Yet its colour and apparent texture, and its projection on the surface of the ovary, are such as belong to true corpora lutea.

33. 24. An Ovary from a Woman who died on the fifth day after delivery at the full period. That which has here the place, form, and size of a corpus luteum, is a cyst or capsule, the walls of which are composed of a white, tough substance, in a nearly uniform layer half a line in thickness. The outer surface of this layer has a corrugated or crenate arrange-

ment ; its inner surface is nearly smooth ; it encloses a cavity, which was filled with clear fluid. Thin, and well organized adhesions, the result of peritonitis, are attached to parts of the surface of the ovary.

33. 25. An Ovary from a Woman who died in the eighth month of her pregnancy. Two cysts, similar to that just described, exist in this ovary ; but one is smaller and more thinly walled than the other.

Only one foetus existed in this case. The concurrence of two corpora lutea, with a single foetus, is also illustrated in No. 21.

33. 26. An Ovary from a Woman twenty-two years old, who died with acute renal disease in the sixth month after parturition at the full period. The place of corpus luteum is occupied by an oval mass of dark greyish substance, firm and compact in every part, about three lines in its chief diameter, and having at its centre a whiter substance with processes extending from all parts of its circumference. This white substance forms the 'stellate cicatrix,' characteristic of the corpus luteum at a late period after delivery. The surface of the ovary over the remains of the corpus luteum bears a well organized peritoneal adhesion.

33. 27. An Ovary, in part of which the blood-vessels are minutely injected. It contains a circumscribed mass of ochre-yellow colour, and a small nearly-closed cavity bounded by a material of nearly similar colour ; examples of doubtful corpora lutea.

Other specimens of corpora lutea are in No. 1 in this Series, and in the Pathological Series 33, Nos. 14, 15, 18.

33. 28. A Pregnant Mouse, with two foetus in each horn of its uterus. The large size of the arteries supplying the uterus is shown by injection.

33. 29. Portion of one of the horns of the pregnant Uterus of a Sow. Its blood-vessels are minutely injected, and its cavity

laid open, showing the transverse undulating folds of its mucous membrane.

33. 30. Portion of the pregnant Uterus of a Sheep, having numerous small and highly vascular elevations, or cotyledons, on its inner surface.

33. 31. Portion of the pregnant Uterus of a Cow, with three cotyledons on its inner surface. The lowest of these is still covered with the foetal amnion and chorion fitted to its surface. From the middle one these membranes are reflected, and the villi of the chorion are shown, which filled the tubular depressions or inflections from the surface of the cotyledon. The upper one is similarly exposed by the reflection of the chorion and amnion.

The four preceding specimens were presented by Dr. Conquest.

33. 32. Portion of the pregnant Uterus of a Mare. Its inner surface is beset with minute vascular elevations very closely arranged.

33. 33. The Pelves of three Guinea Pigs (*Cavia aperea*), and the skull of one just born, showing the adaptations of the pelvis to parturition. Above, the pelvis is shown in its ordinary state, with close approximation of the pubic bones. Below this, is a pelvis taken at the time of parturition, with the pubic bones disparted nearly an inch and a half: the ligament of the symphysis being elongated to the same extent, and the expanded portions of the ilia being carried outwards and upwards with slight elongation of the sacro-iliac ligaments. The lowest of the three pelves was taken seventy-two hours after parturition: and there remains only a very slight separation of the ossa pubis.

Presented by William Birch, Esq.

33. 34. Pelvis of a Guinea Pig at the time of parturition, with separation of the pubic bones and elongation of their ligament.

Presented by Dr. Conquest.

33. 35. The Ovary and adjacent parts of the common Fowl, showing the clustered ovisacs filled with ova in successive stages of developement. One ovum, exposed at the lower part of the oviduct, has acquired all its coverings and a perfect shell. In the upper and front part of the preparation the commencement of the oviduct is shown, and in the lower part the cloaca, with the terminations of the oviduct and the rectum.
33. 36. A similar specimen.
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## S E R I E S   X X X I V .

### THE MAMMARY GLANDS.

34. 1. A Mammary Gland, in the inactive state.
34. 2. A Mammary Gland, from a woman who died shortly after parturition. In comparison with the preceding specimen it shows the great increase in the size of the gland during its period of active function, the enlargement and prominence of the nipple, and the distension of the principal lactiferous ducts.



## SERIES XXXV.

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### DEVELOPEMENT OF OFFSPRING.

Membranes of the ovum, 1 to 16.

Placenta and umbilical cord, 17 to 29.

Corresponding parts in animals, 30 to 37.

Development of the digestive canal and related organs, 38 to 42.

„ Heart, 43 to 48.

„ Blood-vessels, 49 to 52.

Changes of the membrana pupillaris, 53 and 54.

„ position of the testicles, 56 to 64.

Fœtus and fœtal skeletons, 65 to 73.

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35. 1. An Ovum at about the fifth week after impregnation.

Presented by Dr. Conquest.

35. 2. An Ovum at about the same period. As in the preceding specimen, only the exterior of the ovum, with its uniformly flocculent or villous chorion, is shown.

35. 3. An Ovum at about the seventh week. The embryo is injured; its posterior half, with the umbilical vesicle, remaining connected with the interior of the chorion.

35. 4. An Ovum at about the eighth week. The cavity of the ovum is laid open, and the embryo suspended in the liquor amnii by a short thick umbilical cord. The amnion, nearly

pellucid, is detached from the interior of the chorion. It bears a few very delicate filamentous processes on its external surface, which are, probably, remains of the 'Corps reticulé.' The outer surface of the chorion is not flocculent, as in the preceding specimens; its substance is thicker and firmer, and in a large portion of its extent a placenta is developed. Parts of the maternal decidua remain attached to the exterior of the chorion.

Presented by Dr. Conquest.

35. 5. An Ovum at about the eighth week, without the maternal decidua.

35. 6. An Ovum at about the ninth week.

35. 7. A similar specimen. On a large portion of the outer surface of the chorion its villi are distended by small cysts, the commencement of 'hydatid' disease.

35. 8. An Ovum at about the fourteenth week. The amnion is not opened; its outer surface is exposed by the reflection of the chorion and part of the decidua, and is opaque.

35. 9. An Ovum at the beginning of the fourth month. The amnion, chorion, and decidua are separated, and the external surface of the placenta is exposed.

35. 10. An Ovum in the fourth month. The decidua is inverted, so as to show on its inner surface the numerous orifices of tubules in which the villi of the chorion were inserted. The umbilical cord is coiled thrice round the neck of the foetus.

Presented by Dr. Conquest.

35. 11. An Ovum at about the same date, with the umbilical cord coiled four times round the neck of the foetus.

Presented by Dr. Conquest.

35. 12. The Membrane of an Ovum at about the same date. The amnion, chorion, and decidua are separated.

35. 13. A Fœtus in the fifth month, with its amnion and placenta.
35. 14. A Fœtus in the sixth month, with its amnion, chorion, and placenta. The natural position of the child, with its several parts close-packed, may be observed.
35. 15. Portion of Chorion, with its blood-vessels injected.
35. 16. Portion of Amnion, with its blood-vessels injected.  
Presented with the preceding by Dr. Conquest: probably not from the human subject.
35. 17. Placenta, with part of the umbilical cord. The foetal blood-vessels in the placenta are injected, as are also those of part of the amnion reflected from the insertion of the cord.
35. 18. Placenta, from which, by maceration and washing, nearly all the blood was removed. The finely flocculent structure is thus shown, which is formed by the growth of the villi of the chorion and their enclosed foetal blood-vessels.
35. 19. A similar specimen.  
Presented by Dr. Conquest.
35. 20. A similar specimen, prepared after injection of the foetal blood-vessels.
35. 21. Placenta and Cord, dried after the injection of their principal blood-vessels, so as to show the mutually entwining spiral course of the umbilical arteries and vein within the cord, and their large diverging branches on the foetal surface of the placenta.
35. 22. A similar specimen, with the cord attached to the edge of the placenta.  
Presented with the preceding by Dr. Conquest.
35. 23. A Placenta, with an Umbilical Cord three feet in length.  
Presented by Dr. Conquest.
35. 24. An Umbilical Cord, four feet and eight inches in length.  
Presented by E. B. Vise, Esq.

35. 25. An Umbilical Cord in which there is but one artery.
35. 26. Portion of an Umbilical Cord which was found tied into a knot.
35. 27. Placentæ and Foetal Membranes, from a case of twinning.
35. 28. A similar specimen.
35. 29. The Placentæ of three Children born at one birth.
35. 30. A Kitten enclosed in its amnion and chorion, and encircled by its annular placenta.
35. 31. The Placenta of a Kitten.  
Presented with the preceding by Dr. Conquest.
35. 32. A Kitten, with its Placenta, Allantois, and Amnion.
35. 33. Portion of the Chorion of a Foetal Horse. The injection of its blood-vessels shows the numerous minute and close-set vascular eminences which were adapted to the inner surface of the uterus preserved in the foregoing Series (33, No. 32).
35. 34. Portion of the Chorion of a Foetal Horse, dried after the injection of its arteries with mercury, and of its veins with yellow wax.
35. 35. Portion of the Amnion of a Foetal Horse, dried after the injection of its blood-vessels with mercury.
35. 35 A. An Embryo Calf, in its Amnion.
35. 36. An Embryo Skate (*Raia Batis*), with its large umbilical vesicle.
35. 37. Spawn of a Toad.  
Presented by Dr. Arthur Farre.

35. 37 A. A withered Embryo, about four weeks old, with its enclosing membranes and the umbilical vesicle.
35. 38. Portion of a Fœtus in the sixth month, showing the nearly vertical position of the stomach. The lobed form of the kidneys, the comparatively large size of the supra-renal capsules, and the position of the testes, immediately above the inguinal rings, are also shown.
35. 39. Portion of a Fœtal Small Intestine, with largely developed villi, but no *valvulæ conniventes*.
35. 40. Portion of Fœtal Ileum, with the cœcum and its appendix. The appendix is of proportionally large diameter, and enlarges into its continuity with the cœcum much more gradually than in the perfect state.
35. 41. The lower end of the Ileum, with the Cœcum, Colon and Rectum, of a Fœtus, inflated and dried after injection of their blood-vessels.
35. 42. A Fœtal Thymus Gland.
35. 43. The Heart of a mature Fœtus, displaying the nearly equal thickness of the walls of both ventricles.
35. 44. A Fœtal Heart at about the seventh month, showing the foramen ovale and its valve.
35. 45. A similar specimen from a mature Fœtus.
35. 46. A Fœtal Heart at about the sixth month. An opening into the right auricle displays the large Eustachian valve.
35. 47. A similar specimen, from a mature Fœtus. The Eustachian valve is much smaller.
35. 48. The Heart of a Fœtal Calf, with its right auricle laid open. The vena cava inferior opens immediately behind the for-



men ovale, so that their passages are directly continuous, and there is no Eustachian valve. Below the foramen ovale is the large orifice of the coronary vein.

35. 49. The Heart and largest Blood-vessels of a mature Fœtus, dried after injection, so as to show, especially, the ductus arteriosus.
35. 50. Part of a Fœtus, dried after the injection of the heart and principal blood-vessels. It illustrates, especially, the course and relations of the ductus arteriosus, and of the umbilical arteries and vein, the communication of the umbilical and portal veins, and the course and relations of the ductus venosus.
35. 51. A similar specimen, from a Fœtus of earlier age.
35. 52. The Heart, Lungs, and Thymus Gland of a mature Fœtus.
35. 53. Part of the Eye of a Fœtus, with a perfect membrana pupillaris, whose minutely injected blood-vessels converge from those of the iris to its centre.
35. 54. Part of the Eye of a Fœtus, in which none of the membrana pupillaris remains except a narrow fringe attached to the inner margin of the iris.
35. 54 A. An Embryo, about seven weeks old, in which the condition of the brain at this time, as composed of a series of three vesicles, is distinctly shown. The heart projects from the thoracic cavity as yet unclosed.
35. 55. Part of the Eye of a Fœtus, in which the removal of the membrana pupillaris is completed.
35. 56. Part of a Fœtal Pelvis, with the deeper or posterior tendon of the rectus femoris muscle traced round all the upper, posterior, and inferior part of the acetabulum, to the cotyloid notch.

35. 57. Part of a Fœtus, showing, especially, the deeply lobed surface of the kidneys, the comparatively large size of the supra-renal capsules, and the position of the testicles.
35. 58. Part of a Fœtus. The testicles are attached by triangular peritoneal folds extending to the posterior wall of the abdomen, in front of the psoas muscles, and just below the kidneys. A bristle is placed under the right gubernaculum testis.
35. 59. A similar specimen.
35. 60. A similar specimen.
35. 61. Part of a Fœtus, with the testicles, in the course of their descent, lying immediately above the internal inguinal rings.
35. 62. Part of a Fœtus, with the testicles in the scrotum. Bristles are passed through the canals of communication between the cavities of the tunicæ vaginales and the peritoneum.
35. 63. The lower part of a Fœtus, with the right testicle in the abdomen, and the left in the scrotum.
35. 64. Part of a Dog, in which the positions of the testicles resemble those shown in the preceding specimen. The large size of the triangular peritoneal fold connecting the testicle with the posterior wall of the abdomen, and the disappearance of this fold during the descent of the testicle, are also here illustrated.
35. 65. A Fœtus, with the thoracic and abdominal organs displayed *in situ*.
35. 66. A Fœtus about eighteen weeks old.
35. 67. A mature Fœtus of unusually large size. It was born in fifteen minutes from the commencement of parturition, and lived for an hour.

Presented with the preceding by Dr. Conquest.

35. 68. Skeleton of a Fœtus in the fourth month.

35. 69. Skeleton of a Fœtus in the sixth month.

35. 70. Skeleton of a Fœtus in the seventh month.

35. 71. Skeleton of a Fœtus in the early part of the eighth month.

35. 72. Skeleton of a mature Fœtus.

The five preceding specimens were presented by Dr. Conquest.

35. 73. Skeleton of a mature Fœtus.

SERIES SUPPLEMENTAL  
TO THE  
ILLUSTRATIONS  
OF  
PHYSIOLOGICAL ANATOMY.





## S E R I E S   A .

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### CONGENITAL DISEASES AND MALFORMATIONS. UNUSUAL FORMS AND ARRANGEMENTS OF PARTS.

Monsters by excess or duplicity of parts, 1 to 6 A.

Monstrous or unusual forms :

Of the Digestive Organs, 7 to 24.

„ Heart, Pericardium and Valves, 25 to 40.

„ Arteries of the Head and Neck, 41 to 63.

„ „ Upper Extremity, 69 to 95.

„ „ Pelvis and Lower Extremity, 96 to 103.

„ Veins, 104 to 107.

„ Urinary Organs, 108 to 116 A.

„ Brain and Spinal Cord, and their Coverings, 117 to 142.

„ Bones and Joints, 143 to 165 A.

„ Organs of Generation, 166 to 173.

Transpositions of Viscera, 174 to 176.

Congenital Tumours, 177 to 181.

Intra-uterine Amputation, 182.

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A. 1. The Skeletons of two Children. Each skeleton is perfect, except at the anterior wall of the chest. Only one thoracic cavity exists. There are two sterna, which are placed, not in the median line, but at the sides of the thoracic cavity. With each sternum are connected the costal cartilages of the corresponding side of each skeleton. The upper piece of each sternum appears double, so as to be nearly equally connected with the upper ribs of both skeletons ; the other pieces of each are normally formed.

Hydrocephalus, with great enlargement of the cranium, existed in one of the children. The mother was naturally and safely delivered.

Presented by Richard Eyles, Esq.

- A. 2. Skeletons exhibiting in their upper parts duplieity of structure, similar to that in the preceding, but partially united in their lower parts. One thoracic cavity exists, as in the preceding, and the sterna are less perfectly formed. One pelvis also exists, an ischium and pubes being in each skeleton deficient or very imperfectly formed. On the side on which this defect exists, the ilia are united with a mass of soft and partially ossified tissue, with which is also connected a single, large and deformed femur. The tibia and fibula articulated with this femur are also large; and there are eight toes, and, apparently, two ossa calcis in the foot. The pelvis and lower extremities on the other side of the skeletons are well formed.

Presented by — Chadwick, Esq.

- A. 3. Partially double Fœtus. The head and the upper part of the face are single; but the head is large, and especially very wide at the lower part, indicating duplieity of the medulla oblongata, and probably of the cerebellum and other adjacent parts of the brain. There appear also to be two lower jaws imperfectly formed; and, with the exception of the thoracic cavity, all the parts of the trunk and the extremities are double. The genital organs are female.

- A. 4. A nearly similar monstrosity in the Hare; a single head, neck, and chest, with double back, abdomen, pelvis, and limbs.

Presented by R. Sleeman, Esq.

- A. 5. A similar monstrosity in the Cat; but here the trunk and limbs of one fœtus are so small, that it looks like a mere appendage to the other.

- A. 6. A partially double Heart, taken, probably, from an example of double monster, in the Sheep. It has two auricles and four ventricles. Each auricle opens into two ventricles. There are two aortæ, which are united soon after their origins, and two pulmonary arteries, from each of which a ductus arteriosus is continued. From two of the ventricles

an aorta and pulmonary artery arise: from the other two arise two arteries, which are continued into the aortæ.

- A. 6 A. A double Egg from a Hen. Two eggs of ordinary size, but with their membranes imperfectly calcified, are united by an intermediate slender cylinder an inch and a half long. The cylinder is formed of a continuation of the membranes of the two eggs, and appears to contain albumen.

Presented by Alfred Tylor, Esq.

- A. 7. The Head of an Anencephalous Fœtus, in which the palate has a wide fissure, and at its anterior parts is broadly expanded and divergent, in adaptation to duplicity of the lower jaw and tongue. The outer condyles of the lower jaws are normally articulated: their median or inner condyles, closely approximated, are articulated with a mass of bone projecting between and from the fronts of the divisions of the hard palate. The tongues are of full size and united posteriorly.
- A. 8. The Head of a Calf, with fissure of the hard palate and partial doubling of the bones of the face. The nasal bones are of very irregular form, and are separated and set aside by an additional median bone. There are four lacrymal, four superior maxillary, and four premaxillary bones, four palatine, two vomers, and four pairs of turbinal bones: but in each instance of these doubly-pair bones, the inner bones, lying nearest to the median line of the double face, are small and imperfectly formed. The two inner lacrymal bones are united by suture. The two inner superior maxillary bones diverge at an acute angle. The lower jaw is single and well formed.
- A. 9. Head and Limbs of a Fœtus, with hare lip, and a wide complete fissure of the palate. Each hand has five fingers and a thumb, and each foot seven toes.
- A. 10. The Head of a Fœtus, with a wide fissure extending through the whole length of the palate and uvula. The lower border of the nasal septum projects into the middle of the fissure.

- A. 10 A. The Head of a mature Fœtus, with a fissure extending through the entire length of the hard and soft palate and uvula. The tongue and larynx have been divided through the median line, and their halves are set apart. The muscles of the soft palate are dissected, and bristles are passed beneath those of the right side. All the muscles occupied their natural positions. The palato-glossus was found proportionally larger than in the adult. The tensor vel circumflexus palati was, in its outer portion, very short, the pterygoid plates appearing imperfectly developed; its inner or horizontal portion did not appear fibrous. The azygos uvulæ was large, each half of the uvula having its proper muscle. The levator palati was large, and passed between some of the fibres of the palatine portion of the palato-pharyngeus. The last named muscle appeared normal.

Presented by G. F. Lane, Esq.

- A. 11. The Stomach and Intestines of a Boy about twelve years old, and four feet three inches high. The stomach is of less than usual size: the small intestines, of ordinary calibre, are only two feet long; the large intestines measure four feet.

The case is described by Mr. Abernethy, in the "Philosophical Transactions," Vol. lxxxiii. p. 64.

- A. 12. Portions of Ileæ, each with a diverticulum formed of the termination of the omphalo-mesenteric duct, which, instead of being obliterated and absorbed, has grown with the intestinal canal into which it opened.
- A. 13. Portion of Ileum, with a similar diverticulum nearly six inches long. The end of the diverticulum is fixed by firm adhesions in the peritoneal pouch between the bladder and rectum.
- A. 14. A Male Fœtus, at about the third month. A considerable portion of the intestinal canal is contained in a membranous sac, in front of the umbilicus. The lower part of the vertebral canal is open posteriorly, and the left hand is distorted.

- A. 15. Portion of small Intestine, about two feet in length, and closely convoluted, which was protruded through the umbilicus of a child born at the full period. This intestine had no covering of peritoneum or abdominal wall; the umbilicus closely surrounded it, where it was continued into the abdomen.

The child lived forty hours after birth. See Case-Book, No. 167, p. 142.

Presented by S. A. Philbrick, Esq.

- A. 16. The Rectum of a Child with imperforate anus. The rectum terminated more than half an inch above the anus, and above this point forms a sac about five inches in length and four inches in diameter.

Presented by Thomas Warner, Esq.

- A. 17. The Rectum, Bladder, and other parts from a similar case of malformation. The cutaneous and subcutaneous portions of the anus appear well formed, a conical depression from the perineum, with converging folds of skin and mucous membrane, existing as in the natural state. But the space between this depression and the closed termination of the rectum is filled with cellular tissue in a layer between one and two lines thick. Directly above this layer the rectum is dilated in a large pouch.

- A. 18. A Rectum and Bladder. The rectum terminates in a cul-de-sac about an inch from the anus. The urachus is pervious.

Presented by Thomas Davis, Esq.

- A. 19. A similar malformation of the Rectum and Anus. A layer of cellular tissue, nearly an inch in depth, intervenes between the anal depression and the closed end of the intestine. A large rupture of the colon, about four inches from the cœcum, was occasioned by the accumulation of fecal matter.

Presented by William Radnor, Esq.

- A. 20. A similar malformation, in which, as in Nos. 14 and 16, the



anal depression is well formed, and more than half an inch deep ; but between it and the dilated termination of the rectum, an interval of nearly an inch deep is filled with cellular tissue. A bristle is placed in an aperture in the end of the rectum, made with a trocar in an attempt to give passage to the fæces.

- Λ. 21. A similar specimen ; but the trocar passed by the side of the rectum, and did not enter it.
- Λ. 22. The Rectum of a Child fourteen months old, in which, at birth, the anus was imperforate. The rectum was punctured from the anus with a trocar, and the aperture remained open for the passage of fæces. Where the partition existed between the rectum and anus, there is now an annular fold of mucous membrane, projecting, like a perforated diaphragm, in the canal of the intestine, about two-thirds of an inch from the anus. At this fold, the mucous membrane is smooth, and appears very dense ; above and below, it is deeply wrinkled. The muscular coat of the rectum above the fold is very thick.

Presented by Henry Bateman, Esq.

- Λ. 23. A similar specimen from a Child who lived two years after the puncture of the rectum. The tissues punctured appear to have been torn or cut in making the preparation ; but the insufficiency of the aperture is proved by the great distension, the thick muscular walls, and the large follicles, of the rectum above it.
- Λ. 24. A Sheep's Gall-bladder bilobed at its fundus.
- Λ. 25. The Heart of an Adult, in which the septum of the auricles is almost wholly wanting. Its place is represented by only a crescentic fold projecting from the upper part of the single auricular cavity. In this fold, at the upper and back part, the fossa ovalis is distinct. The adjacent portions of the tricuspid and mitral valves appear continuous with each other

over the septum of the ventricles. The rest of the heart appears well formed.

The patient, a man about forty years old, lived and died without signs of disease of the heart. He died with diseased kidneys. The case is related by Dr. Kirkes, in the "London Medical Gazette." 1851.

A. 26. The Heart of a Child about ten years old. The right auricle appears normal, except in that the foramen ovale is wide open. The tricuspid valve is a narrow ring of membrane with scarcely a trace of tendinous cords. The right ventricle is scarcely more than half an inch in diameter; its walls are thick, but much fibrous tissue appears mixed with the muscular. The pulmonary artery is closed in the situation of its valves; beyond its closure it gains a normal diameter. The ductus arteriosus was pervious. The left auricle, left ventricle and aorta, and their valves, are normal, except in that the aorta is large from its origin to its communication with the ductus arteriosus.

A. 27. The Heart of a Child ten years old, similarly, but in a less degree, malformed. The foramen ovale is closed; the right ventricle larger than in the preceding; its wall very thick and strong; the pulmonary artery is not closed, but is very narrow at its orifice. A portion of glass is passed from the right ventricle, through the narrow pulmonary artery, the ductus arteriosus, and the aorta.

Presented by Henry Bateman, Esq. Case-Book, No. 92, p. 52.

A. 28. The Heart of a Child seven weeks old. The right auricle is normal, except in that the foramen ovale is wide open. The right ventricle is extremely small. The orifice of the pulmonary artery is very narrow; its trunk of more nearly natural size. The ductus arteriosus is closed, or so nearly closed, that a bristle could be passed through only part of its length. The left side of the heart and the aorta are of normal shape, but very large.

A. 29. The Heart of a Child ten years old. The auricles form a single very large cavity, which communicates with the left

ventricle alone. A fold from the posterior wall of this cavity marks the place of the imperfect septum. The right ventricle is a small flattened cavity, and communicates with the left ventricle by a circular aperture, little more than a line in diameter, near the base of the septum. The pulmonary artery appears nearly normal, but is small in comparison with the aorta. The left ventricle is very large and strong-walled. The ductus arteriosus is not preserved.

- A. 30. The Heart of a Child about three years old. In the place of the septum of the auricles only a slender cord crosses their common cavity ; and between the ventricles no rudiment of septum appears. Thus the heart has but a single cavity. Externally, it has nearly the natural shape and size ; and the walls of the ventricles are almost uniformly thick. The rudiments of the mitral and the tricuspid valves are arranged, like a single valve, in a ring between the auricular and ventricular cavities. The pulmonary artery is very small, and has no valves. The ductus arteriosus is removed, but there is an opening in the aorta at the point of its usual junction with the duct.
- A. 31. The Heart of a Person about sixteen years old. The right auricle appears normal, and the foramen ovale is closed. The walls of the right ventricle are thick ; and its fleshy columns are so large and numerous, that it appears as if divided into two cavities communicating by narrow orifices indicated by bougies. The part of the right ventricle which leads to the pulmonary artery is very small, and so is that artery at and near its orifice. At the upper part of the ventricular septum is a large oval smooth-edged aperture, above which the aorta is so placed that both ventricles alike open into it. The left auricle and ventricle are normal. The aorta is large ; the ductus arteriosus is closed.
- A. 32. The Heart of a Person twenty-eight years old, malformed like the preceding. The communication between the pulmonary artery and right ventricle is a narrow channel, just

admitting the passage of two portions of fine straw. Earthy matter is deposited at the upper orifice of this channel; and above it the pulmonary artery acquires a nearly normal diameter, but has thin coats. The foramen ovale and ductus arteriosus are not preserved.

Case-Book, No. 78, p. 40.

- A. 33. An Heart, said to be from an Adult, but of small size. It is malformed, like the two preceding, except in that the foramen ovale is wide open. The walls of the right ventricle are, in even a greater proportion than in the preceding specimens, thicker than those of the left.
- A. 34. The Heart of an Adult of ordinary size. The pulmonary artery appears completely closed by the adhesion of the valves at its narrow orifice, and beyond this closure its trunk is small and thin-walled. Earthy matter is deposited in the valves. The defect in the ventricular septum, and other malformations, exist as in the preceding specimens. The foramen ovale is slightly and obliquely open at the front: the ductus arteriosus is not preserved.
- A. 35. The Heart of a Lad sixteen years old, with an extremely narrow two-valved pulmonary artery, a deficient ventricular septum, and other malformations similar to those in the last preceding specimens. The ductus arteriosus is nearly closed: only a bristle could be passed through it. The foramen ovale is obliquely and slightly open at the front.
- A. 36. A similar specimen from a Lad eighteen years old. The foramen ovale is wide open. The ductus arteriosus is not preserved.

Presented by Henry Bateman, Esq.

- A. 36 A. The Heart of a Boy who had cyanosis. It is of very large size, all its cavities being dilated. The walls of the right ventricle are rather thicker than those of the left. An oval aperture, nearly an inch in diameter, exists at the upper



part of the ventricular septum, exactly between the orifices of the pulmonary artery and the aorta. The orifice of the pulmonary artery is of natural or rather more than natural size; its valves are well formed, but some earthy deposits existed at their base: the orifice of the aorta is rather smaller than natural. In the fossa ovalis there is a small anterior aperture.

The boy died suddenly with rupture of the right auricle just below the entrance of the vena cava inferior, the walls of the auricle being distended to extreme thinness. The condition of the ductus arteriosus does not appear.

Presented by Thomas Warner, Esq.

It may be observed that in all the foregoing specimens of malformation of the heart, with the exception of the last, the pulmonary artery is either very small or closed in and near the situation of its valves; in one specimen, in which it is least diminutive, there is no communication between the right auricle and ventricle. Associated with this hindrance to the passage of the blood through the right side of the heart, two varieties of malformation are combined. In the majority of specimens, the ventricular septum is incomplete at its base, and the aorta is placed directly over the aperture of communication between the ventricles, and opens equally into both; the walls of the right ventricle are very thick; and the ductus arteriosus is usually, or perhaps always, either closed or very narrowly contracted. In other specimens, the septum of the ventricles is complete; the right ventricle is very small; the left ventricle comparatively large and strong; and the ductus arteriosus is wide open. In both forms, the foramen ovale is usually open. Its openness, while all other parts of the heart are well formed, is shown in No. 25, and in the Pathological Series XII., No. 36.

A. 36 B. The Heart and part of the left Lung of a Man, in whom no pericardium existed. The heart, naturally formed, lay in the cavity of the left pleura. The serous covering of the heart is continuous, through the medium of that of the pulmonary vessels, with the pulmonary pleura; and the serous covering of the aorta and venæ cavæ is reflected into continuity with



the parietal or costal pleura. The left phrenic nerve, lying on the pleura, passes to the right side of the heart, in front of the right phrenic nerve.

Presented by Dr. Baly.

- A. 37. A Pulmonary Artery, with four valves. One is of less than the natural size, but of healthy tissue.
- A. 38. A similar specimen, but the additional valve is even smaller.
- A. 39. Part of a Heart, with an aorta having but two valves. One of the valves has a nodule of indurated tissue near one of its angles; and in both there are small fatty deposits.
- A. 40. A similar specimen.  
 Several examples of aorta having but two valves, and those diseased, are in the twelfth Pathological Series.  
 They illustrate the peculiar liability of valves thus defectively formed to become the seats of later disease; and are examples of what appears a general rule, that parts, originally misshapen, are liable to disease more than well-shaped parts are.
- A. 41. The Arch of an Aorta, giving-off only two principal branches. From one of these, as an arteria innominata, proceed the right subclavian and two carotid arteries: the other is the left subclavian.
- A. 42. A similar specimen. In both these instances the arteria innominata passes obliquely across the front of the trachea.
- A. 43. A similar specimen.
- A. 44. A similar specimen. The left carotid arises very near the origin of the innominate artery.
- A. 45. The Arch of an Aorta, from which arise:—(1) an arteria

innominata, that gives-off, as in the preceding specimens, the right subclavian and both carotid arteries; (2) the left vertebral artery; (3) the left subclavian.

- A. 46. The Arch of an Aorta, from which, together with its three usual branches, the left vertebral artery arises. Ascending behind the left carotid, the left vertebral artery enters the aperture in the transverse process of the fifth cervical vertebra.
- A. 47. A similar specimen: the left vertebral artery entering the canal at the fourth cervical vertebra.
- A. 48. The Arch of an Aorta, giving-off:—(1) the right carotid; (2) the left carotid; (3) the left subclavian; (4) the right subclavian. Arising from the back of the extremity of the arch the right subclavian artery ascends, and then passes transversely to the right behind the œsophagus.
- A. 49. A similar specimen. The right vertebral artery arises from the right carotid, and enters the foramen in the transverse process of the fourth cervical vertebra.
- A. 50. A similar specimen: the right vertebral artery entering at the fifth cervical vertebra.
- A. 51. A similar specimen of unusual arrangement of the right subclavian artery. The right inferior laryngeal nerve branches from the pneumogastric, opposite the lower border of the cricoid cartilage, and passes to its distribution in a direct, instead of a recurrent, course.
- A. 52. The Arch of an Aorta, from which arise:—(1) the right carotid artery; (2) the left carotid; (3) the left vertebral; (4) the left subclavian; (5) the right subclavian.
- A. 53. An Abdominal Aorta giving-off on the left side four, and on the right three, renal arteries.

A. 54. An Abdominal Aorta, with five renal arteries proceeding from it to the left kidney.

A. 55. The Bifurcation of an Abdominal Aorta; the common iliac arteries are less than an inch in length.

A. 56. The Bifurcation of an Abdominal Aorta, with common iliac arteries three inches and a half in length.

It is probable that this difference of length in the common iliac arteries was due entirely to the variation in the place of division of the aorta; and that in both cases the division of the common iliacs took place opposite the same point, the upper margin of the sacro-iliac symphysis.

A. 57. Arteries from a Neck. The innominate gives a branch to the thyroid gland (*arteria thyroidea ima*).

A. 58. A similar specimen.

A. 59. A Thyroid Gland of ordinary size, to which six arteries pass, each as large as an average inferior thyroid artery. Of the two additional arteries, one proceeds from the innominate, the other from the right common carotid an inch from its origin.

A. 60. Common Carotid Arteries, dividing opposite the cricoid cartilage.

A. 61. An external Carotid Artery, giving-off all its branches close to its own origin. The bulbous form of the internal carotid artery is here very marked.

A. 62. Right Carotid Arteries. Of the usual branches of the external carotid, two arise from the common carotid, namely, the occipital and the superior thyroid; and one, probably the posterior aural, arises from the internal carotid.

A. 63. An external Carotid Artery, with two superior thyroid arteries arising close to its origin.

- A. 64. Internal Carotid Arteries, each of which makes a long sigmoid curve before entering the petrous bone.
- A. 65. A Left Subclavian Artery, passing in front of the scalenus anticus muscle. The right subclavian takes the usual course.
- A. 66. Arteries of the Neck. The right vertebral artery enters its canal at the fourth cervical vertebra, the left at the sixth.
- A. 67. An additional Inferior Thyroid Artery, passing from the right subclavian across the front of the common carotid, about half an inch from the division of the innominate artery.
- A. 68. A Right Inferior Thyroid Artery proceeding from the vertebral an inch from its origin.
- A. 69. An Axillary Artery, dividing in the middle of its course into two branches of equal size, which, after passing nearly parallel along the upper arm, take the places respectively of the radial and the ulnar arteries.
- A. 70. An Arm with its Arteries. The artery which has the place of the brachial, and divides into the radial and ulnar, is of small size, and gives-off no branches in the upper arm. On its inner side is a large artery derived from the axillary; and this, pursuing the usual course of the brachial, and giving-off the usual branches in the upper arm, passes, at the bend of the elbow, into the position of a median artery, and anastomoses with the ulnar to form the superficial palmar arch.
- A. 71. An Axillary Artery giving-off a large branch, which supplies the infra-scapular, posterior circumflex, and superior profunda, and then passes down the arm, behind the brachial artery, and becomes the interosseous artery in the fore-arm.
- A. 72. An Axillary Artery, giving-off a branch which descends nearly parallel with the brachial along the upper arm, and then,

crossing in front of the brachial, is distributed in the muscles arising from the internal condyle.

- A. 73. A Brachial Artery, from which the ulnar arises at the middle of the arm, and passes over the muscles at the inner side of the bend of the elbow.
- A. 74. A similar specimen ; the ulnar artery arising lower in the arm. The injection of the superficial veins shows the proximity of some of them to the superficially placed ulnar artery.
- A. 75. A Brachial Artery, giving-off, at the upper part of the arm, a large branch, which descends on its inner side, and joins the ulnar at the bend of the elbow.
- A. 76. A similar specimen. The superficial palmar branch of the radial artery is long and large.
- A. 77. A similar specimen, in which, moreover, the branch descending from the brachial to the ulnar is joined by one of equal size from the inferior profunda.
- A. 78. A similar specimen.
- A. 79. A Brachial Artery, giving-off the radial at the upper part of the arm.
- A. 80. A similar specimen.
- A. 81. A similar specimen, except in that the radial artery passes down the arm on the inner side of the brachial, and crosses in front of it at the bend of the elbow ; while in both the preceding specimens the radial artery lies outside the brachial in its whole length.
- A. 82. A Brachial Artery, giving-off near its commencement a large branch, which descends on its outer side and joins the radial artery.



- A. 83, 83 A. Arteries from both Arms of the same Person. In the right, the brachial artery divides high up in the arm; the radial artery gives-off the interosseous; and a branch from the deep palmar artery of the radial unites with a branch of the superficial palmar arch to supply the middle finger. On the left side, there is a similar high division of the brachial artery; and a large branch from the ulnar descends superficially in the fore-arm, and ends in communications with the superficial palmar arch and one of the branches given from the radial to the thumb.
- A. 84. A Brachial Artery from which the interosseous arises at the middle of the arm.
- A. 85. A Brachial Artery, dividing, two inches above the bend of the elbow, at once into radial, ulnar, and interosseous. Thus, three large arteries lie close together, and superficially in the front of the joint.
- A. 86. An anterior Interosseous Artery, which, in the lower part of its course, passes to the inner margin of the ulna, and divides into branches to the inner and back part of the hand. The ulnar artery arises from the brachial high up in the arm, and passes over all the muscles at the bend of the elbow except the palmaris longus.
- A. 87. An Ulnar Artery, giving-off, at the upper part of the forearm, a large median artery, from which arise, in the palm, the digital arteries for the first finger and the radial side of the second.
- A. 88. A Radial Artery, dividing, near its origin, into two branches of nearly equal size, which pursue an almost parallel course in the fore-arm. At the wrist, one of them passes, like an ordinary radial artery, to the back of the radius; the other remains in front, and gives-off the superficial palmar branch.
- A. 89. A Radial Artery, similarly dividing, or giving-off its superficial palmar branch in the middle third of the fore-arm.

A. 90. A Radial Artery, giving-off its superficial palmar branch higher than usual, and then passing to the back of the radius over the extensor tendons of the thumb.

A. 91. A similar specimen. The superficial palmar arch is not formed. The deep palmar branch of the radial is very large, and from it and the deep palmar arch large branches proceed to join the digital arteries.

Presented by W. B. Jackson, Esq.

A. 92. A Radial Artery, whose terminal branch passes along the palmar surface of the metacarpal bone of the fore-finger, and unites with the digital artery supplying the adjacent margins of that and the second finger.

A. 93. A Radial Artery, whose deep palmar branch is of large size, and joins the first digital branch of the superficial palmar arch.

A. 94. An anterior Interosseous Artery, passing across the front of the lower end of the radius, and uniting with the radial artery.

A. 95. An Ulnar Artery, given-off from the brachial in the middle of the arm, and passing superficially over the muscles on the inner side of the bend of the elbow. The deep palmar branch of the radial artery is unusually large, and, where it joins the corresponding branch of the ulnar, it gives-off the digital artery for the opposite sides of the third and fourth fingers.

A. 96. Pelvic Organs and Arteries. The right internal pudic artery gives-off, in addition to its usual branches, a large artery, the accessory pudic, which proceeds forwards by the side of the lower part of the bladder, then close along the right side of the prostate gland, anterior to which it passes through the triangular ligament and enters the penis. In the penis, this artery takes, especially, the place of the dorsal artery. The right internal pudic artery takes its usual course, but terminates in the perineal artery.

A. 97. Internal Pudic Arteries giving-off the arteries of the bulb, at about the junctions of the ischia and ossa pubis. From their origins the arteries of the bulb proceed almost transversely across the perineum, and their trunks are an inch in length.

A. 98. An external Iliac Artery, from which the epigastric and obturator arteries are derived by a common trunk. The obturator curves over the outer margin of Gimbernat's ligament to its aperture in the pelvis.

Similar specimens are in the Pathological Series XVII., Nos. 55, 69.

A. 99. A Femoral Artery, from which a large branch, arising in the upper part of the thigh, is continued parallel with the trunk, and, after a course of about seven inches, ends in the popliteal artery.

A. 100. A Posterior Tibial Artery, accompanied in its whole course along the leg by a large branch, which is given-off from it near its origin, and which ends, near the ankle-joint, in anastomosis with the peroneal artery.

A. 101. A Leg, in which there is no posterior tibial artery. The peroneal artery is of large size, and its continued trunk passes across the back of the ankle-joint, to the inner side of the os calcis, and thence takes the place, and supplies the usual branches, of the posterior tibial.

A. 102. A Leg, with a very small anterior tibial artery, and a peroneal artery as large as the posterior tibial. The anterior branch of the peroneal artery gives a large transverse branch to the anterior tibial; and from the junction of these the anterior tibial is of ordinary size.

A. 103. A Leg, in which there is no peroneal artery.

A. 104. Vena Cava Inferior, ascending, on the left side of the aorta, to the diaphragm, and then obliquely crossing over the aorta to the inferior surface of the liver.

A. 105. A similar specimen: the aorta is in the median line.

A. 106. Common Iliac Veins, ascending to the first lumbar vertebra before uniting to form the inferior cava.

A. 107. Two left common Iliac Veins. At the junction of the left external and internal iliac veins, two large trunks are formed, which proceed parallel to each other, and of which one joins the right common iliac vein, and the other joins the trunk thus formed a little higher up.

Cases of transposition of blood-vessels are in Nos. 174, 175, 176, in this Series.

A. 108. Kidneys united at their lower ends by a broad band of renal substance, so as to form a continuous mass shaped like a horse-shoe. Each lateral half has a pelvis, the median portion has none.

A. 109. A similar specimen of unusually large size. The median portion has separate arteries and veins, but no pelvis.

A. 110. A similar specimen.

A. 111. Kidneys of unequal size, and combined into an irregular form by portions which passed across the median line.

A. 111 A. A Kidney, from an adult. It consists of several nearly distinct portions loosely connected with a common elongated pelvis, and of unnatural structure, apparently from granular degeneration. The other kidney was sound.

A. 112. A Kidney, the infundibula of which unite to form the ureter, without the intervention of a pelvis.

A. 113. A Kidney, with two ureters.

A. 114. A similar specimen. The ureters united about three inches from their single opening into the bladder.



- A. 115. A right Kidney, with the adjacent blood-vessels injected. The kidney rests on the right common iliac artery, with its hilus directed forwards. It receives one artery, at its hilus, from the left common iliac, and two from the aorta, just above the bifurcation. One of these two passes behind the kidney, winds round it to its anterior surface, and nearly reaches the hilus before it enters the kidney.
- A. 116. Urinary Organs of a Fœtus. The bladder is greatly dilated and hypertrophied; the ureters equally so, especially near their terminations in the bladder. In the kidneys are numerous cysts, lined by thick corrugated membrane, many of which appear to be formed by dilatation of the calyces and infundibula. The proper renal substance is wasted. The cysts were filled with transparent fluid.
- A. 116 A. The Urinary and Genital Organs, with the front of the pelvis, of a man twenty-one years old, in whom 'Ectopia vesicæ' existed. The ossa pubis, separated to a distance of an inch and a half, were connected by only a few thin fibrous bands. In the space between them, and between the lower parts of the recti abdominis muscles diverging to be inserted in them, and through a corresponding fissure in the other tissues of the abdominal wall, the posterior wall of the urinary bladder protruded its vascular and uneven mucous surface. The orifices of the ureters are here indicated by portions of glass; they are raised on papillæ; the rest of the mucous surface presents the same appearance as during life, except in the loss of its vascularity. The penis is an inch and a half in length. The urethra is open from above in its entire length, being indeed little more than a furrow extending along the upper part of the penis to the open cavity of the bladder. The testes are small, but well formed; they lie in a small scrotum; the vasa deferentia have their natural course and relations. The prostate is small and deficient in its anterior part, where the urethra is open. The vesiculæ seminales also are small. The ureters are natural in size and in relations.

Presented by A. M. McWhinnie, Esq., by whom the case, with illustrative drawings, is published in the "London Medical Gazette," 1850.



- A. 117. An Anencephalous Fœtus. The spinal cord and medulla oblongata appear normal, but no trace of brain exists. The spinal nerve-roots are perfect, as well as some of those arising from the medulla oblongata; bristles are placed beneath the cranial portion of the accessory nerve.
- A. 118. A similar specimen. The cerebral extremities of the cranial nerves, which are not connected with the medulla oblongata, lie free at the base of the cranial cavity.
- A. 119. A Fœtus similarly malformed, showing the loose, soft, and vascular or bloody tissue, with which the collapsed and nearly obliterated cranial cavity is covered.
- A. 120. A Fœtus similarly malformed, and having its skin marked with large dark brown spots, which were believed to be due to syphilis.

Presented by Dr. Conquest.

Skulls and skeletons of fetuses similarly malformed are in Nos. 136, 137, &c.

- A. 121. Brain of a Girl twenty-two years old, who from birth was completely idiotic. It is of extremely small size, measuring only four inches in its greatest length, three and a half inches in its greatest width, and three and a quarter in its greatest depth. But, with this smallness, it observes the usual proportions in its several parts; its growth alone seems to be defective. Its convolutions are few, but of the normal width.
- A. 122. The Skull of the same Idiot Girl. The form and size of its cranial portion exactly correspond with those of the brain; its facial portion is comparatively large and well formed, yet is below the average size.
- A. 123. Brain of a Man twenty-two years old, idiotic from birth. In its total size, it is rather less than that last described. Its weight, in the recent state, was 13oz. 2dr. avoirdupois. It is, however, distinguished from the last by the imperfect

developement, as well as imperfect growth, of the cerebrum, which is small in comparison with the cerebellum, and of which the posterior lobes are so diminutive, that they do not cover more than the anterior third of the cerebellum.

- A. 124. The Skull of the same Idiot. Its cranial portion exactly corresponds with the brain in size and form ; its facial portion is of average dimensions. It has been described as

“The cranium of a human Idiot, in whom nature may be said to have performed for us the experiment of arresting the developement of the brain, almost exactly at the size which it attains in the Chimpanzee, and where the intellectual faculties were scarcely more developed. Yet no anatomist would hesitate in at once referring this cranium to the human species.

“A detailed comparison with the cranium of the Chimpanzee or Orang, shows that all those characters are retained in the Idiot's skull which constitute the differential features of the human structure.

“The cranial cavity extends downwards below the level of the glenoid articulatory surfaces. The nasal bones are two in number, and prominent. The jaws and teeth exhibit the bimanous characters as strongly as in the most elevated of the human race. The cuspidati do not project beyond the contiguous teeth ; and consequently, there are no interruptions in the dental series, as in the Orang's, where they are required to lodge the disproportionate crowns of the canine teeth.”—Owen, “On the Osteology of the Chimpanzee and Orang-Utan,” in the Transactions of the Zoological Society, Vol. i. p. 343. Plates 57 and 58 are from this skull.

Models of the brains of both these idiots, and a cast of the head and face of this last described, are preserved.

- A. 125. Part of a Cerebral Dura Mater, deficient in the anterior half of the falx.
- A. 126. A similar specimen.
- A. 127. Spina Bifida. With defective formation of the laminæ, or

arches, of the lower lumbar and the sacral vertebræ, a sac is formed by the protrusion of the dura mater of the spinal cord. The cavities of the sac and of the spinal canal are shown by lateral section, and their continuity is marked by bristles passed through their narrow aperture of communication. Two large nerve-roots appear to have been protruded with the sac of dura mater, and are adherent to its posterior wall.

A. 128. A similar specimen, with the sac opened from behind. Several nerve-roots pass out from the spinal canal, and are adherent to the inner surface of the sac.

A. 129. A similar specimen of Sacral Spina Bifida, from a Child about six years old. The spinal canal and sac are laid open from behind, showing the passage of some of the sacral nerve-roots from the cord into the sac. The spinal cord reaches to the last lumbar vertebra.

A. 130. A similar specimen. The spinal cord extends into the sacral portion of the canal.

A. 131. A Sac, formed in the occipital region, by protrusion of the dura mater through an aperture in the occipital bone, similar to those in the sacra shown in the preceding specimens. With the dura mater, a portion of brain, covered with pia mater and arachnoid, is protruded. The aperture in the occipital bone is about two lines in diameter, and situated in the median line below the spine.

The case is described by Mr. Earle in the "Medico-Chirurgical Transactions," Vol. vii. p. 427.

A. 132. A Sacrum, in the whole length of which the spinal canal is wide open behind, through defective formation of the laminæ or neurapophyses.

A. 133. Dorsal and lumbar portions of a Fœtal Spine. The spinal canal is wide open behind, the laminæ or neurapophyses of nearly all the vertebræ being disparted and turned outwards.

They are not deficient in size ; rather, they are overgrown and expanded at their distal ends.

- A. 134. Part of a Fœtal Skeleton, from a case of hydrocephalus with spina bifida. Except those of three dorsal and two cervical vertebræ, all the laminæ are deformed and disparted like those in the preceding specimen. The occipital bone also appears to have been similarly defective.
- A. 135. Two specimens of defect in the formation of the posterior Arch of the first Cervical Vertebra. In one, the deficiency is median, the ends of the laminæ, symmetrically formed, being about a quarter of an inch apart. In the other, the right lamina is entirely deficient, and the left has rather less than its due length.
- A. 136. The Skull of an Anencephalous Fœtus. Its base is complete, but small and flattened ; the several bones appearing crowded, and shorter, thicker, and rounder at their edges than in the natural state. The upper part of the skull is very incomplete, and presents a large round central aperture, the margins of which are formed by the edges of the rudiments of the frontal, parietal and occipital bones. These rudiments consist of little more than narrow slips of bone flatly depressed towards the base of the skull, and so nearly touching it, that the hollow which represents the cranial cavity is only about two lines in depth. The orbits also are peculiarly flattened, and their superior walls small and receding.
- A. 137. Skeleton of an Anencephalous Female Fœtus. The defect of the cranium is like that in the last specimen ; but the bones of its upper part are even less developed, so that its base projects between and above them. The arches of the vertebræ are separate and everted in nearly the whole length of the vertebral column. In the dorsal portion rudiments of neural spines are formed along the middle line, distinctly from the arches. The remainder of the trunk, and the limbs, of the fœtus appear well formed.



A. 138. A similar specimen of conjunction of Anencephalia and complete Spina Bifida in a Female Fœtus. The bones of the upper part of the skull are, in this case, larger, and the parietal, as well as the frontal bones, meet in a median suture; but, as in the preceding cases, they are depressed nearly into contact with the base of the skull.

A. 139. The separate Bones of the Skull of an Anencephalous Fœtus, marked according to the descriptions of the cranial vertebræ.

A. 139 A. A Brain, in which the corpus callosum and fornix are imperfectly formed. In the place of the corpus callosum is a transverse band or commissure measuring only an inch and a quarter from its anterior to its posterior margin. In this band, the anterior margin, or knee, of the corpus callosum appears well formed, but is partially separated by a fissure from the rest of the substance. This remaining substance, representing the body of the corpus callosum, is a very thin layer consisting of transverse and oblique fasciculi of nerve-fibres, which are traced outwards and backwards into the substance of the hemispheres. The posterior margin of the corpus callosum, thus imperfectly formed, corresponds with the front of the optic thalami, leaving the remainder of those bodies, the corpora quadrigemina, the pineal gland, and the posterior and middle commissures, covered by the velum alone. Of the septum lucidum no trace exists, and of the fornix only the lateral portions. The rest of the brain appears well formed.

The brain was taken from a girl twenty-one years old, who presented an ordinary condition of mind. The case is related, and the brain more minutely described, by Mr. Paget in the "Medico-Chirurgical Transactions," Vol. xxix. p. 54.

A. 140. The Skeleton of a Fœtus, born with hydrocephalus. It is well formed, except at the head, which measures twenty inches in circumference, and seventeen inches from the nose to the foramen magnum. The bones of the upper part of the cranium are wide apart, lying separate on the extended



dura mater. The base of the cranium is flattened-out and widened.

The uterus was ruptured in parturition. See Pathological Series XXXII. 48.

- A. 141. Skull of a Fœtus, born with hydrocephalus. The ossification of the bones of the upper part of the skull is extremely irregular.

Presented, with the preceding, by Dr. Conquest.

- A. 141 A. Skull of an Hydrocephalic Fœtus.

- A. 141 B. Skull of a Lamb congenitally hydrocephalic.

- A. 142. Skeleton of a Fœtus at about the seventh month, showing the effects of hydrocephalus and rachitis. The head is enlarged and singularly deformed: and its enlargement having taken place in the vertical and transverse directions, much more than in the antero-posterior, it is broadly pyriform. This peculiarity appears to have been connected with an irregular mode of ossification of the bones of the upper part of the skull. A single and continuous case of bone, widely open in front and above, occupies the place, and imperfectly imitates the form, of the frontal, parietal, and occipital bones. The other cranial bones are not misshapen, but are depressed, set-apart, and bowed-out by the pressure of the hydrocephalic fluid. All the bones of the cranium are light, dry, and porous. The ribs and the bones of the pelvis and extremities are short, thick, and porous; and those of the lower extremities are unnaturally curved.

- A. 143. A Male 'Cyclopiæ' Fœtus, in which, through defect of the ethmoid bone, both eyes are placed in one orbital cavity, and mutually compressed. The eyelids, also, are united so as to form a single wide aperture; and there is no external appearance of a nose.

- A. 144. Head of a Fœtal Pig, similarly malformed. The single orbital cavity is placed immediately above and in front of

the upper jaw, which appears to have receded behind it. Above the orbital cavity the nose projects like a proboscis; it appears of unnatural length, not because of overgrowth, but because of the insufficient developement of the upper jaw, and the inferior position of the eyes.

A. 145. A similar specimen, but with a larger developement of the upper jaw and lip.

A. 146. Skull of a Fœtal Pig, similarly malformed. The upper wall of the single orbit is formed by the coalition of the orbital plates of the frontal bone, and the lesser wings of the sphenoid; these being united by sutures into one broad plate, at the posterior margin of which are the optic foramina. The inferior wall of the orbit is chiefly formed by the diminutive and approximated superior maxillary bones. All the cranial bones are closely joined by sutures. The frontal bones, completely united at their anterior part, and thence projecting, bear at their extremity the long and deformed nasal bones, on which depends the proboscis-like form of the snout shown in the preceding specimens.

A. 146 A. A similarly malformed 'Cyclopian' Kitten.

Presented by Dr. James Reid.

A. 147. An Adult Male Skull, with the first four Cervical Vertebæ. On the right side of the base of the skull, an unusual conoidal process, three quarters of an inch in length, and half an inch in diameter, extends downwards, and at its extremity curves slightly forwards. It proceeds from the inferior surface of the occipital bone, immediately behind the jugular foramen, midway between the condyle and mastoid process. On the anterior aspect of its distal extremity is a smooth oval surface, by which it articulated with a corresponding surface on the posterior part of the right transverse process of the atlas. The other parts of the skull and vertebæ are normally formed.

A. 148. Skull of a Fœtal Lamb, with defective formation of the

lower jaw. The ascending rami are nearly normal, but they are connected only by a short transverse plate of bone. The mouth terminated posteriorly in a cul-de-sac, having no communication with the œsophagus.

- A. 149. The first four Cervical Vertebrae of an Adult. The foramina for the passage of the left vertebral artery are much smaller than those for the right in the first, third, and fourth vertebrae; and in the second no aperture exists on the left side, the two constituent portions of the transverse process being completely fused.
- A. 150. An Adult Spine, with thirteen Ribs on each side. The additional ribs are connected with the seventh cervical vertebra, and are formed by its pleurapophyses, or anterior portions of its transverse processes, being exceedingly developed. These were cut-off near the spine, so that their length and mode of termination cannot be stated.
- A. 151. An Adult Female Thorax. The twelfth rib is deficient on the left side, and rudimental on the right. The left fifth rib is bifurcate; but the cartilages connected with its two portions are united before their junction with the sternum.
- A. 152. An Adult Skull, to which the first cervical vertebra is inseparably united. They are united by bone at every part, except at a small space in the median line anteriorly, and at the apertures through which the vertebral arteries and suboccipital nerves passed. The bone uniting them is so healthy and smoothly continuous with the adjacent surfaces, that it may be presumed the union was accomplished before birth. The sutures between the premaxillary and superior maxillary bones are not closed.
- A. 153, 154. The Scapulæ and Clavicles of an Adult. On the inferior surface of each clavicle, about an inch from its scapular extremity, there is a broad oval process, the flattened free surface of which articulates with the upper

surface of the base of the coracoid process. The articulations were provided with cartilages and synovial membranes.

- A. 155. *Ossa Innominata and Femora.* No round ligament existed in either hip-joint ; and in the place of the usual attachment of the ligament to the head of the femur an elevation of bone exists. In all other respects the bones appear natural ; and it is believed that the absence of the ligaments was congenital.
- A. 156. *A Shoulder-joint.* The long tendon of the biceps muscle is unusually slender, and lies between the synovial and fibrous layers of the capsule.
- A. 157. *Portions of the Front Wall of an Abdomen, with lobular masses of fat projecting through apertures in the imperfectly formed linea alba.* On the posterior surface, corresponding with the projecting fat, the peritoneum is very thin, and in some places altogether wanting.
- A. 158. *Portion of an Adult Hand, with a Supernumerary Thumb.* This thumb is small and distorted ; but it has a distinct flexor muscle and tendon, and a slip of tendon passes to it from that of the long flexor of the normal thumb. There is an appearance of a separate extensor tendon passing to the additional thumb.
- A. 159. *Two Supernumerary Little Fingers removed from a Child's Hands.* They are malformed, and were attached by narrow pedicles.

Presented by J. F. Crookes, Esq.

- A. 160. *Upper Extremities, with distortion of the Hands.* Each hand is bent so as to form a right angle with the radial margin of the fore-arm. In one hand the thumb is deficient ; in the other, it is malformed, and attached by a pedicle.

In the delivery of the foetus, the distorted hands were mistaken for feet.

Presented by Dr. Conquest.



A. 161. Lower Extremities, with distortion of the Feet. Each foot is turned upwards and backwards, so that its tibial margin is in contact with that part of the leg which corresponds with the posterior and internal margin of the tibia.

A. 162. The Skeleton of a Man, about thirty years old, who had a singular deformity of the chest, and Talipes varus of both feet.\* The sternum, though itself well formed, is depressed so as to be within from two to three inches of the dorsal vertebræ. The anterior extremities of the ribs, normally directed in their first course, bend backwards to the level of the sternum, to which they are as usual connected by costal cartilages that pass nearly transversely. The bones of the legs and feet are small, light, and fatty. The chief deformity is, or begins, in the astragalus, the head or anterior part of which is directed inwards, so as to form a right angle with its posterior and upper part. The articular surface of the head of the astragalus is so placed, that what is normally its transverse diameter is directed from before backwards. All the bones of the foot are adapted to this inward-turning of the head of the astragalus; the long axes of them all (except the os calcis) being directed inwards instead of forwards. The anterior part of the os calcis is directed somewhat inwards, but much less so than that of the astragalus; and the os cuboides is adapted to the deformity by being displaced to the inferior part of the os calcis, with which it articulates on an anormal surface. On the left side the chief tendons are left attached to the bones of the foot.

Presented by Dr. Burrows.

A. 163. Skeleton of a Male Fœtus, with fissure of the sternum. The first two ribs of both sides are united by a single portion of cartilage, with which also the clavicles are connected. The cartilages of the remaining ribs on each side are connected with a single narrow slip of cartilage, representing an ill-formed half sternum. In the right arm, a single cylindrical bone has the place of radius and ulna; and another,



united to it by cartilage, represents alone the bones of the hand.

A large aperture existed in the front wall of the abdomen, through which the viscera were protruded with a peritoneal sac.

Presented by William Taylor, Esq.

- A. 164. Skeleton of a Fœtus, in which the left lower extremity and the left half of the pelvis are deficient. The spinal canal is open in the lumbar and sacral regions, through defect of the vertebral arches; indeed, those of the left side of the sacrum and of the last three lumbar vertebræ appear to have been never formed. To the posterior part of the right ilium a series of bones are attached, which may represent rudiments of the ilium, ischium, femur, and tibia, that are wanting on the left side.

Presented by Thomas Stocker, Esq.

- A. 165. Skeleton of a Fœtus, in which the arches of the lower lumbar vertebræ are imperfectly formed, and in place of the sacrum there is a single distorted bone. The ischia are absent or rudimental, and a single bone, representing the heads of both femora, articulates in the middle line with both the imperfect acetabula. The two femora are fused in their upper halves. Their diverging lower halves articulate with the tibiæ fused into a single short conical bone. Behind and beyond the tibiæ, a series of small bones represent the fibulæ and feet, but cannot be severally recognized.

- A. 165 A. A Fœtus similarly malformed, and having the chief muscles of the imperfect lower extremity dissected. The simple conical shape of the parts below the pelvis has obtained for this malformation the name 'Sireniform.' Casts of this fœtus, before its dissection, are preserved.

- A. 166. Urinary Bladder, with the Genital Organs, of a Man fifty years old. The left vas deferens terminates abruptly in a cul-de-sac at the situation of the external inguinal ring. The other parts of the spermatic cord are continued to the

scrotum, where there is a slight expansion of their tissues, but no trace of any of the structures of a testicle. The vas deferens is pervious in its whole course, and is connected in the usual manner with the vesicula seminalis. The right testicle, and the parts connected with it, are normal; and the vesiculæ seminales are of equal size.

The case is described by Mr. Paget in the "London Medical Gazette," August 20, 1841.

A. 167. The Penis of an Adult, with Epispadias. A median cleft along the back of the penis extends into the urethra, from its orifice to the pubes. A loose fold of integument covered the fissure in its whole extent. The penis is short; but its other parts are well formed.

A. 168. Two Ovaries, taken from a Woman on the day after delivery at the full term. One of them has the normal form, but is twice as large as is natural. The other is yet larger, and of an elongated oval form, and measures two inches and a half in length. In this ovary is a large corpus luteum.

A. 168 A. The Internal Genital Organs of a Woman in whom no uterus existed. The ovaries are perfect and marked with cicatrices. Only one Fallopian tube exists, and this is not pervious in its whole length. The vagina terminates in a cul-de-sac.

The patient was forty-five years old, and died with apoplexy. She had been married twenty years; but her hymen, which had a circular aperture, remained entire. The sexual peculiarities of other parts than the uterus and tubes appeared in no respect wanting: and she had been 'regular' within a month or two of her death.

Presented by W. F. Barlow, Esq.

A. 169. An Uterus, from a middle-aged Woman. Its cavity, from its fundus to the upper part of its cervix, is divided into two parts by a thick median partition. Each division of the cavity communicates with its corresponding Fallopian tube. On the exterior of the uterus, only a slight depression in the middle of its upper surface marks the interior division.

- A. 170. Part of the imperfectly formed Male Genital Organs of a Mule between the Horse and Ass. The testicles are very small and irregularly shaped, and have scarcely any trace of natural secreting structure. The vasa deferentia and epididymes are more nearly normal : on one side they are injected with mercury.
- A. 171. The remaining Male Genital Organs of the Mule, with the Urinary Bladder. The vesiculæ seminales, prostate gland, and Cowper's glands are displayed, and appear of normal size.
- A. 172. The Female Genital Organs of a Mule between the Horse and the Ass. They appear not imperfectly formed.
- A. 173. The Internal Genital Organs of a Free-Martin, or Calf born as a twin with a bull-calf, and having the external characters of a cow-calf. The genital organs are hermaphrodite, consisting of an imperfect vagina ending in a cul-de-sac ; a rudiment of an uterus, apparently devoid of cavity ; Fallopian tubes and small wrinkled ovaries ; vasa deferentia, and vesiculæ seminales.

Presented by Dr. Conquest.

- A. 174. Blood-vessels, and other parts, from a young Woman in whom the viscera were transposed, and the great veins arranged in an unusual manner. All the abdominal viscera were transposed, except the cœcum, ileum, and jejunum. The general direction of the jejunum and ileum was from the left side to the centre of the abdomen, where the ileum opened into the cœcum. From the cœcum, the colon pursued an irregular tortuous course, and ended in a sigmoid flexure, which proceeded from right to left into the rectum. The thoracic viscera are exactly transposed ; and there is a corresponding transposition of all the large blood-vessels.

The vein formed by the junction of the iliac, renal, spermatic, and other extra-abdominal veins, and taking thus the position of a transposed vena cava inferior, passed through

the aortic opening of the diaphragm to the left of the aorta. From this opening it passed upwards through the chest, in the course of the vena azygos, but equal in size, as well as parallel, with the aorta. Like a transposed vena azygos, also, and maintaining its symmetry with the aorta, this vein curved over the left bronchus, and united with the vena cava superior. The great hepatic veins united into a large trunk, which passed through the tendinous centre of the diaphragm, to the transposed right auricle.

The position and course of the thoracic duct are transposed in correspondence with the blood-vessels. The spleen consists of several portions.

The case is described by Mr. McWhinnie, in the "London Medical Gazette," Vol. 26, p. 31. See Case-Book, p. 130, No. 137.

- A. 175. Body of a Child, about ten months old, with partial transposition of the viscera, and an irregular arrangement of the blood-vessels.

"The appearance of the body strongly implied that the child had, when living, possessed much vigour of constitution. The situation of the heart was reversed: the basis of that organ was placed a little to the left of the sternum, whilst its apex extended considerably to the right, and pointed against the space between the sixth and seventh ribs. The cavities, usually called the right auricle and ventricle, were consequently inclined to the left side of the body. The inferior vena cava passed, as usual, through a tendinous ring in the right side of the centre of the diaphragm; it afterwards pursued the course of the vena azygos, the place of which it supplied: after having united with the superior cava, the conjoined veins passed beneath the basis of the heart, to expand into the anterior [or transposed right] auricle. The veins, returning the blood from the liver, united into one trunk, which passed through a tendinous aperture in the left of the centre of the diaphragm, and terminated immediately also in the anterior auricle.

"The distribution of blood to the lungs, and the return of it from those bodies, were accomplished after the usual manner.



“ The aorta, after it had emerged from the posterior ventricle of the heart, extended its arch from the left to the right side, but afterwards pursued its ordinary course along the bodies of the dorsal vertebræ.

“ From the curvature of the aorta there first arose the common arterial trunk, which, in this subject, divided into the left carotid and subclavian arteries, whilst the right carotid and subclavian proceeded from the aorta by distinct trunks.

“ The inferior aorta gave off the *cœliac*, which as usual divided into three branches; however, that artery which was distributed to the liver, appeared larger than common; it exceeded, by more than one-third, the size of the splenic artery of this subject. This was the only vessel which supplied the liver with blood, for the purpose either of nutrition or secretion\*.

“ The *vena portarum* was formed in the usual manner, but terminated in the inferior cava, nearly on a line with the renal veins. The umbilical vein of this subject ended in the hepatic vein.

“ The liver was of the ordinary size, but had not the usual inclination to the right side of the body; it was situated in the middle of the upper part of the abdomen, and nearly an equal portion of the gland extended into either hypochondrium.

“ The gall-bladder lay collapsed in its usual situation; it was of a natural structure, but rather smaller than common; it measured one inch and a half in length, and half an inch in breadth. On opening the bladder, we found in it about half a teaspoonful of bile.

“ The intestines did not contain much alimentary *fæcal* matter: this was, however, as usual, deeply tinged with bile.”—Extract from the account of the case related by Mr.

\* This statement refers to the extra-uterine period of the child's life. Before birth, the blood of the umbilical vein was, probably, as usual, carried through the liver: the branches of that vein remain in the liver, and it is nearly certain that the terminations of the hepatic artery pass into connexion with them in the usual manner. See Kiernan; *Philosophical Transactions*, vol. cxxiii. p. 758, 1833.



Abernethy in the "Philosophical Transactions," Vol. lxxxiii. p. 60, 1793.

- A. 176. Part of a Fœtal Calf, with partial transposition of viscera and other malformations. The apex of the heart is directed forwards and to the right; and the aorta passes along the right side of the spine. The spine is tortuously curved. The œsophagus terminates in a cul-de-sac at the lower part of the chest.

- A. 177. Portions of a Tumour, from the anterior mediastinum. They consist of irregularly lobed portions of skin and fat, a bone resembling a superior maxillary bone, and another portion of bone like an alveolar border, with sockets, in which are imbedded two incisor, two cuspidate, and three molar teeth.

The patient was a woman twenty-one years old. The tumour was probably congenital. Fourteen months before her death, while she was suffering apparently with pneumonia, a part of the tumour projected below the sternal extremity of the left clavicle, and pulsated regularly and strongly. It was treated as an aneurism, with repeated bleedings, &c., and after enlarging for some time, and threatening suffocation by pressure on the trachea, it began to subside, and at length wholly disappeared from sight and touch. A month after this, the patient died with renewed pneumonia.

The tumour was closely attached to the upper two-thirds of the sternum, and the sternal extremity of the right clavicle. The arteria inuominata was completely enveloped by the thickened cellular tissue which connected the tumour with the surrounding parts; and it is probable that hence was derived the pulsation which was felt while the tumour was inflamed and swollen. Besides the substances shown in the preparation, the tumour contained serous fluid, and sebaceous matter, mixed with hair. The bones were enclosed in a fatty mass.

The case is related by Dr. Gordon, in the "Medico-Chirurgical Transactions," Vol. xiii. p. 12, 1825.

Presented by William Kingdon, Esq.

- A. 178. The Pelvis of a Female Infant, with a cyst attached to it. The cyst is about six inches in diameter, and is formed of dense membrane, covered with integument. It is firmly attached to the inferior border of the walls of the pelvis, and a small portion or lobe of it extends into the pelvis between the rectum and the sacrum. At the upper part, small cysts

in its walls project into the cavity of the main cyst. These smaller cysts contained a serous fluid: the larger cavity contained serous fluid and blood, and is lined with a fine transparent membrane. The sacrum and coccyx are perfect, but firmly attached to the posterior and upper part of the cyst. No communication existed between the cyst and the canal for the spinal cord formed by the dura mater; but, external to the dura mater, there were communications between the cyst and the spinal canal of the sacrum and coccyx, through some of the foramina for the anterior sacral nerves. Certain of these nerves also were traced to the interior of the cyst.

The child was born alive at the full period. In its passage through the inferior aperture of the pelvis, the tumour burst, and discharged a large quantity of sanguineous fluid. After birth the child cried and moved freely; but it lived only two hours, dying, apparently, in consequence of the hemorrhage from the cyst.

Presented by Thomas Wormald, Esq.

- A. 179. Portion of a Spine, with the Pelvis, and a congenital Tumour, from a child two years old. The tumour measures fourteen and a half inches in circumference: it projects from the lower part and right side of the pelvis; and is composed of several oval and spheroidal lobes. One portion is solid, and resembles a fibrous tumour of the uterus. Another, much larger, consists of two cysts, one enclosed within the other, and both having dense, fibrous, laminated walls, a quarter of an inch thick. They contained a clear yellow fluid. The upper and narrow portion of the tumour is solid, and extends into the cavity of the pelvis through its inferior aperture. It reaches nearly to the top of the sacrum, and encompasses the bladder and rectum. The sacral and other parts of the spine are perfect: no communication exists between the tumour and the canal for the spinal cord; and its connexions with the sacrum and the pelvic organs are by loose cellular tissue.

The child was in other respects healthy and well formed. The tumour at birth was nearly as large as an orange, and increased in proportion to the child's growth. Death occurred during measles.

This and the preceding specimen are described by Mr. Stanley, in the "Medico-Chirurgical Transactions," Vol. xxiv. p. 231, 1841.

Presented by J. F. Harding, Esq.

- A. 180. Part of a large Tumour removed from a woman's nates. The tumour consisted chiefly of a collection of cysts, with tough fibrous walls, lined by smooth membrane, and variously filled. Some contained serous fluid; some a thicker, creamy, or fatty matter; in some were small bundles of hair, loose, or inserted in their walls. Other parts of the tumour consisted of solid substance, in which irregular masses of bone were imbedded.

The patient was a woman about fifty years old. The tumour was congenital, and had grown to the size of the patient's head. It was pendulous from the nates, and parts of it had suppurated. Its deeper attachments were closely connected with the coccyx, rectum and vagina. The patient recovered perfectly after its removal; a small sinus remained at one portion of the wound, but no recurrence of the growth ensued.

- A. 181. The portions of Bone obtained by maceration from the tumour last described. They are of irregular nodulated forms, and not comparable with any of the natural bones of the skeleton.

- A. 182. A Fœtus, born at the full term. Both its legs were amputated within the uterus. In both, the amputation is about an inch below the knee; and the ends of the stumps are contracted and smoothly cicatrized. One of the stumps, being dissected, shows the muscles and other tissues terminating in the usual white fibrous tissue of cicatrix. The arteries and veins are obliterated to some distance above their divided extremities.

The amputated parts were not found.

## S E R I E S   B.

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### ENTOZOA AND OTHER PARASITES.

- B. 1.    Acephalocyst hydatids, from the human liver.
- B. 2.    Similar Acephalocysts. On the internal surface of one, which is suspended and everted, there is an appearance of clusters of small opaque vesicles : these are, probably, clusters of Echinococci.
- B. 3.    Portions of an Acephalocyst, the walls of which are separated into several layers.
- B. 4.    Acephalocyst, from the liver of a Pig. It is opened and everted to show the groups of endogenous acephalocysts attached to its internal surface.
- B. 4 A.    Acephalocyst hydatids, rolled up and compressed in the cyst which was formed around them. Between their membranes are half-dried portions of the secretions of the walls of the cyst. The changes here shown are such as are commonly observed, in connexion with inflammation of the adventitious cysts formed around hydatids in the liver and other organs. See also No. 30, in the 18th Pathological Series.
- B. 5.    Portion of a *Tænia Solium* (Tape-worm), from the human small intestine.

- B. 6. Portion of a *Tænia Solium*, with its digestive canal and ovaries injected with mercury. The digestive canal is constructed of the straight tubes near the borders of the segments; the ovaries are the arborescent tubes within them.
- B. 7. Portion of a *Tænia lata*, passed from the intestines of a young woman, born of Swiss parents, but living in Scotland.
- B. 8. *Tænia serrata*, from the small intestines of a Dog.
- B. 9. *Filaria Medinensis* (Guinea Worm), from the human subcutaneous tissue.
- B. 10. *Spiroptera hominis*, from a woman's urinary bladder.  
The case is described by Mr. Lawrence, in the "Medico-Chirurgical Transactions," Vol. ii. p. 385.
- B. 11. *Ascaris Lumbricoides*, from the human small intestine. Its intestinal canal and long oviducts are displayed.
- B. 12. A similar specimen.
- B. 13. Portion of the Stomach of a Horse, with several Botts or Larvæ (*Æstrus Equi*), attached to its inner surface.
- B. 14. *Distoma hepaticum* (Fluke), from the liver of a Sheep.
- B. 15. Parasitic Fungus, on the extremities of the bodies of Larvæ; from New Zealand.

Presented by John Mawdesley, Esq.



## SERIES C.

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### MISCELLANEOUS SPECIMENS OF NATURAL HISTORY, &c.

- c. 1. Four Ermine Weasels, or Stoats (*Mustela erminea*), stuffed ; showing the changes of colour of their hair in the transition from summer to winter. The dark summer-colour is gradually lost in every part except the head and the tip of the tail : the belly retains its slight yellowish tinge.

Presented by Dr. Roupell.

- c. 2. A Rat ; from South America.

Presented by F. Lekeux, Esq.

- c. 3. A young Opossum (*Didelphis marsupialis*).

Presented by Dr. Arthur Farre.

- c. 4. Wingless Bird of South Australia (*Apteryx Australis*).

Presented by Edward Stanley, Esq.

- c. 5. Lizard ; from Guernsey.

Presented by W. S. Ward, Esq.

- c. 6. Gecko (*Stellio Gecko*).

Presented, with the two following, by Dr. Arthur Farre.

- c. 7. Skink (*Scincus officinalis*).

c. 8. Ringed Snake (*Coluber Natrix*).

c. 9. *Rana arina*; from South America.

Presented by Dr. Walter.

c. 10. *Proteus anguinus*.

Presented by Dr. Roupell.

c. 11. Sucking Fish (*Echeneis Remora*).

Presented by W. Rowland, Esq.

c. 12. Sucker of a Remora.

c. 13. Skin and Dermal Bones of a Porcupine Fish (*Diodon punctatus*).

Presented by Lucas Hooper, Esq.

c. 14. A Porcupine Fish (*Diodon novem-maculatus*).

c. 15. Pipe Fish.

c. 16. Hippocamp.

c. 17. Cow Fish (*Ostracion cornutus*).

c. 18. Sun Fish (*Ostracion bicaudalis*).

Presented, with the preceding, by Mr. Delamotte.

c. 19. Foetal Shark (*Squalus Tiburo*).

c. 20. Common Calamary (*Loligo vulgaris*).

c. 20. Pen or Gladius of a Calamary.

c. 21. Goose Barnacle (*Pentalasma anatiferrum*).

c. 22. Lobster (*Astacus marinus*).

c. 23. Common Crab (*Cancer Pagurus*).

Presented, with the preceding, by W. S. Savory, Esq.

- c. 24. Scorpion (*Scorpio occitanus*).

Presented by E. Webb, Esq.

- c. 25. Tarantula.

- c. 26. Locust.

Presented by Joseph Travers, Esq.

- c. 27. Sponge, attached to a portion of Coral-rock.

Presented by Dr. Roupell.

- c. 28. Horn of a Rhinoceros.

Presented by J. Howard, Esq.

- c. 28 A. Sections of Rhinoceros-horn.

- c. 29. Foot, with the hoofs, of a Tapir (*Tapirus Americanus*).

- c. 30. Horns of an Indian Antelope (*Antilope Cervicapra*).

- c. 31. Horns of a Chamois (*Antilope Rupicapra*).

- c. 31 A. Horns of a Red Deer (*Cervus Elaphus*).

- c. 32. Horns of a Red Deer ; from a Turf-Moss near Lancaster.

Presented by Christopher Johnson, Esq.

- c. 33. Horns of a Ram (*Ovis Aries*).

- c. 34. Horns of a Buffalo (*Bos Bubalus*).

- c. 35. Horns, probably of a Musk Ox (*Bos moschatus*).

- c. 36 and 36 A. The Feet of a Chinese Woman, contracted and atrophied in consequence of tight bandaging in early life.

- c. 37. Sections of Fossil Bones, probably of the Horse and Deer.

Presented by Dr. Mantell.

c. 38. Head of an Egyptian Mummy from Thebes.

c. 39. Mummy of a Bird, from the ruins of Antinæ on the Nile.

Presented, with the preceding, by H. Rowlandson, Esq.

c. 40. Head of an Egyptian Mummy, from a tomb in the Necropolis of Thebes. The ethmoid bone was removed by the embalmers to enable them to extract the brain. 'In the most perfect specimens of their art they draw the brain through the nostrils, partly with a crooked piece of iron, and partly by the infusion of drugs.'—Herodotus, Lib. ii. Cap. 86.

Presented, with the two following specimens, by Alfred Waters, Esq.

c. 41. Mummy of a Serpent, with its coverings, from Thebes.

c. 42. Ribs from a Mummy, in a tomb at the Ancient Memphis. They had been fractured, and were reunited with superabundant formation of bone.

c. 43. Hand of a Mummy; the dried muscles and tendons of the fore arm are split in fine bundles.

c. 44. Foot of the Mummy of a Child.

c. 44 A. Mummy of a Cat.

Presented by Dr. Hogg.

c. 45. Dried Head of a New Zealander tattooed.

c. 46. Natural Mummy of a Child, buried in the year 1777.

c. 47. Portion of Human Skin converted into adipocire.

c. 48. A similar specimen.

Presented, with the preceding, by Dr. Kidd.

c. 49. Portion of Muscle and Fat, converted into adipocire.

**MICROSCOPIC STRUCTURES.**





# MICROSCOPIC STRUCTURES.

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Blood-corpuscles, 1 to 8.  
Soft tissues, 9 to 21.  
Cartilage, 22 to 27.  
Bone, 28 to 59.  
Teeth, 60 to 69.  
Mouth, palate, œsophagus, 70 to 73.  
Stomach, 74 to 77.  
Small intestine, 78 to 93.  
Large intestine, 94 to 102.  
Liver, 103 to 107.  
Thymus Gland, 108.  
Lung, 109 to 125.  
Branchiæ and air-bladder, 126 to 129.  
Trachea and Bronchi, 130 to 132.  
Kidney, 133 to 146.  
Nervous Centres, 147-8.  
Organs for smell, 149.  
    „   „ sight, 150 to 154.  
    „   „ taste, 155 to 158.  
    „   „ touch, 159 to 184.  
The appendages of the skin, hair, nails, &c. 185 to 187.  
Organs for motion, 188-9.  
    „   „ generation, 190 to 196.  
Morbid structures, 197 to 228.  
Urinary and other inorganic deposits, 229 to 245.  
Miscellanea, 246 to 255.

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The following specimens in this series were presented by John Quckett, Esq., 3, 70, 71, 75, 82, 84, 87, 88, 90, 91, 92, 96, 97, 98, 99, 100, 113, 115, 123, 132, 134, 135, 145, 152, 153, 154, 159, 162, 163, 193, 193A, 204.

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1. BLOOD-CORPUSCLES of an Human Embryo, about four weeks old.  
The blood-corpuscles are spheroidal, fully coloured cells, containing one, or, in some instances, two circular nuclei.

The blood is described by Mr. Paget, in the "London Medical Gazette," 1850.

2. Blood-corpuscles of a Noctule-Bat (*Noctula vulgaris*). They are less than  $\frac{1}{4000}$  of an inch in diameter.
3. Blood-corpuscles of a Napu Musk-Deer (*Moschus Javanicus*). They are of the smallest size yet observed, measuring about  $\frac{1}{10000}$  of an inch in diameter.
4. Blood-corpuscles of a Swallow (*Hirundo rustica*).
5. Red and white blood-corpuscles of an Emeu (*Dromaius Novæ Hollandiæ*). They are much larger than the preceding, but have the broadly oval form, with nuclei, such as are common to the whole class of birds.

Presented by Dr. A. Hannover.

6. Blood-corpuscles of a Newt (*Triton cristatus*). They are of large size, elongated, elliptical, more than  $\frac{1}{1000}$  of an inch in length, with nuclei less elongated than themselves.
7. Blood-corpuscles of a Frog (*Rana temporaria*).
8. Blood-corpuscles of a Sea-Angler (*Lophius piscatorius*). Mingled with them are fragments of the muscular fibres of the heart.
9. A cluster of small Lobules of Fat, from the arm of an human foetus, with their blood-vessels minutely injected. In general, a single artery passes to each lobule, and from its branches a very close capillary network is derived, which is spread over the surface, and in the substance, of the lobule. Each cell of the adipose tissue has a capillary vessel near it, or arching over it. There is little anastomosis between the minute vessels of adjacent lobules.
10. A similar preparation of adipose tissue from the neck of a Rook (*Corvus frugilegus*). The lobules of fat have generally an elongated oval form, and the capillary vessels are very minute and close-set.
11. A similar preparation of Lobules of Fat, from a Snake (*Coluber*

Natrix). In comparison with the preceding, the capillary vessels are large, and the network formed by them is widely meshed.

12. A similar preparation of Lobules of Fat, from the abdomen of a Frog (*Rana temporaria*). Probably, it was made in the summer season; for the capillary plexus is very close, and its vessels tortuous, the contents of the fat-cells being absorbed, and the cell-walls collapsed. In the winter, with accumulation of fat, the plexus presents wider meshes.
13. A layer of Epithelium-Cells, from a Frog's foot.
14. Fasciculi of yellow fibrous or elastic Tissue, from the ligamentum nuchæ of a Giraffe (*Camelopardalis Giraffa*). The fibres are very large, and, in addition to the flatness, the hard dark edges, the branching, and the curled abruptly-broken extremities common to many examples of this tissue, they present peculiar transverse markings.
15. Transversely striated muscular Fibres, from a Pig. Some of the filaments are shown separated from the fibres or primitive fasciculi.

Presented by Dr. Richard Quain.

16. Transversely striated muscular Fibres of a Mole-Cricket (*Grylotalpa vulgaris*). Their proneness to transverse cleavage, in the direction of their dark transverse markings, is strongly indicated.
17. A similar specimen of muscular Fibres from a Locust.
18. Portion of Muscle, from a Cat, with its blood-vessels minutely injected. The course of the capillaries, parallel to one another and to the muscular fibres, and their occasional communications by transverse or oblique branches, are perfectly shown. In one portion of the specimen several muscular fasciculi are set apart; in the rest they lie close, as in the natural state.
19. A vertical section of the Tongue of a Cat, with its blood-vessels

minutely injected. According to the direction of the muscular fibres, so is that of the capillaries, some of which run longitudinally, while others cross them at right angles, passing upwards through the tongue to the bases of its papillæ.

20. Portion of muscular tissue from a Duck (*Anas Boschus*). In addition to the proper blood-vessels of the muscle, like those shown in No. 18, others are here displayed, of which some belong to the cellular sheath of the muscular fasciculi, and some to the fat. The latter resemble exactly the vessels described in No. 10; the former present an arborescent arrangement of branching arteries and veins, whose general direction is across that of the muscular fibres, and which lead to a wide-meshed superficial capillary network. Each of the arteries is here accompanied by the veins.

An arrangement similar to this may be observed in the blood-vessels of tendons and of their cellular sheaths in the Physiological Series IV. No. 4, 5, described at p. 5 of this volume.

21. Portion of Muscle from a Frog (*Rana temporaria*), with its blood-vessels minutely injected. The arrangement of the vessels is as in the preceding specimens; but they are larger, and placed more widely apart, in adaptation to the larger size of the muscular fibres.
22. Transverse section of the Chorda dorsalis of a Lampern (*Petromyzon fluviatilis*). It is an example of one of the simplest forms of cartilaginous tissue; consisting of nucleated cells, which are regularly oval, or, through mutual compression, polygonal. They lie in mutual contact, like the cells of vegetable cellular tissue. The whole chorda is ensheathed in a thin layer of fibrous tissue, and the transverse section of its axis presents the appearance of a fissure, around which the cartilage-cells are grouped.
23. Section of the Cartilage of a Mouse's Ear. Its structure is as simply and wholly cellular as that last described; but the cells are very much smaller.



24. Transverse section of the Cartilage of an Adult Rib.
25. Section through the thickness of a Cartilage, probably of the larynx or trachea, of an Elephant.
26. Section of Articular Cartilage, from a finger. It shows clearly the vertical direction of the cartilage-corpuscles near the bone, while those near the free surface of the cartilage are in a plane parallel with it, and the more perfect cellular condition of the corpuscles in the former, than of those in the latter, situation.
27. Section of Cartilage from the Jaw of a Shark. Groups of nuclei, apparently without cell-walls or spaces round them, are irregularly imbedded in an abundant intermediate substance, which is striated as if it possessed an imperfect fibrous structure.
28. A longitudinal section of the cartilaginous animal basis of a bone, obtained by maceration in acid. The lacunæ or bone-corpuscles appear distinct, as small cavities in the cartilage, but the canaliculi leading from them are scarcely seen.
29. A transverse section of a Bone similarly deprived of its calcareous matter. The laminæ surrounding the Haversian canals are distinct, with the lacunæ between them ; but here also the canaliculi are scarcely visible.
30. Section of a calcined Human Femur.
31. Section of an Human Bone long buried, and called ' fossil,' but presenting no unusual texture.
32. Vertical antero-posterior section of one of the Bones of the upper part of a Skull.
33. Vertical transverse section of the same or a similar Bone. Both these specimens show very well the transition, with only slight modifications, of laminated structure, in portions of bone which surround, respectively, the Haversian canals, and the spaces in the diploe or cancellous tissue.

34. Section of a similar Cranial Bone, cut parallel and near to its outer surface.
35. Section of a similar Cranial Bone, cut parallel and near to its inner surface. In both specimens, the arrangement and form of the Haversian canals may be traced ; especially, their frequent dilatations where branches of blood-vessels meet or diverge.
36. Section of the petrous portion of a Temporal Bone. The arrangement of the branching Haversian canals is well shown, but their walls are not distinctly laminated, and the corpuscles or lacunæ are placed without any apparent relation to the canals.
37. Transverse section of a Clavicle. The minute structure of bone, as usually described, is extremely well illustrated by this specimen.
38. Transverse section of an Humerus.
39. Transverse section of a Femur.
40. Longitudinal section of a Femur, made near to its outer surface.
41. A similar section from near the inner surface of a Femur.
42. Transverse section of a Fibula.
43. Longitudinal section of the last Phalanx of a Finger. In some very thin portions of the section the lacunæ or corpuscles are not seen, or appear pellucid.
44. Transverse section of the Femur of a mature Fœtus. The Haversian canals are proportionally large and numerous, and lamellæ are not formed, or are very few and obscure, around them.

45. A similar specimen.
46. Transverse section of a long Bone of an Australian Bat.
47. Transverse section of a long Bone of a Bear.
48. A similar specimen from a Lion.
49. Longitudinal section of the lower Jaw of a Sperm-Whale. Large lacunæ exist, with numerous canaliculi, many of which, arranged in lines and superjacent, give an appearance as of canals arching in regular curves at the sides of Haversian canals.
50. Transverse section of the Humerus of an Hippopotamus.
51. Longitudinal section of a long bone of a Rhinoceros.
52. Transverse section of a Tibia of a Camel.
53. Transverse section of a Tibia of an Ornithorynchus. A comparatively thick layer of its exterior is distinctly laminated. Its Haversian canals and lacunæ, or bone-corpuscles, are smaller than those of the preceding Mammalia. In them a general uniformity is observed in nearly all the characters of the osseous structure; but in this there is an approximation to the characters of the bones of birds.
54. Longitudinal section of a long Bone of a Tortoise (*Testudo*). Its bone-cells or lacunæ, and their canaliculi, are, as in reptiles generally, very large and numerous; the Haversian canals are few and large.
55. Transverse section of the Tibia of a Monitor Lizard. The Haversian canals are very few; the lacunæ or corpuscles large, though smaller than in the Tortoise; their canaliculi extremely numerous.
56. Section of Bone from a Menopome. It is remarkable for the

extremely large size of its corpuscles or lacunæ, and for the abundance of their canaliculi, which, with their numerous branchings and anastomoses, intersect the substance of the bone as with a minute network.

57. Section of Bone from a Siluroid Fish. It is intersected by a close but irregular plexus of fine canaliculi, slight dilatations of which, various in form and size, and with no distinct arrangement, represent the lacunæ. The Haversian canals are numerous, and canaliculi from adjacent lacunæ generally radiate towards them.
58. Section of the Jaw Bone of a Shark. It presents very large and branching Haversian canals, from the sides of which canaliculi, of much larger size than any in the preceding specimens, proceed, and with branchings and anastomosis, but few dilatations, intersect the substance of the bone as in the specimen last described.
59. Section of the Saw of a Saw-fish (*Pristis*).
60. Longitudinal section of an Human Molar Tooth.
61. Transverse section of the Crown of a similar Tooth.
62. Longitudinal section of an Human Canine Tooth. With the two preceding specimens, it illustrates completely the usual description of the minute structure and arrangement of the three component tissues of the human teeth.
63. Transverse sections of a Molar Tooth of a Hare (*Lepus timidus*).  

Presented by Dr. Hannover.
64. Transverse section of a Molar Tooth of a Beaver (*Castor Fiber*). In this, as in the preceding specimen, the component structures of the tooth resemble essentially those of the human teeth: but their arrangement is more complex. The layer of enamel is seen not only investing the exterior of the crown, but entering



its interior with involuted folds. The interspace enclosed by each fold is filled with coarse cement or bone, possessing perfect bone-corpuscles or lacunæ; and the spaces between adjacent folds, and between the folds and the external enamel, include two diverging sets of dentine-tubes.

65. Longitudinal section of the Incisor Tooth of a Camel. The 'curvatures' of the dentine-tubes are well marked in the numerous shaded bands that traverse the dentine in lines parallel with the surfaces of the tooth.
66. Transverse section of Whalebone. The interior presents sections of canals, surrounded by concentric circles of pigment-granules. In these canals the papillæ for the formation of the whalebone were lodged: the arrangement of the pigment indicates a concentric laminar structure. The exterior of the section presents no sections of canals, but an irregular marking, with groups of pigment-granules, and an appearance of minute tubules or fibres arranged in lines parallel to the borders of the section.
67. Longitudinal section of a Tooth from the Saw of a Saw-fish (*Pristis*). Large vascular canals are placed at nearly regular distances; and from each are given-off, as from the Haversian canals in the Shark's bone (No. 58), abundant branching and diverging tubes or canaliculi. Their branches are confined to a certain area around the canal, within which they freely anastomose; but they rarely pass beyond this area to anastomose with the canaliculi of an adjacent canal. Hence the system of branches from each canal appears enclosed within a narrow light border of granular cemental substance.
68. Longitudinal section of a similar Tooth.
69. Transverse section of a Tooth, or dental plate, of a *Myliobates*. It is constructed on the same general plan as the preceding; but the tubules or canaliculi are larger and less branched, and the structure is more distinct than that shown in No. 67.



70. Portion of the Mucous Membrane of a Mouth, with its blood-vessels and those of the long slender papillæ minutely injected.
71. A similar preparation of the Mucous Membrane and Papillæ of the Mouth of a young Pig. The papillæ are nearly cylindrical, and each has a single tortuous capillary loop.
- 71 A. The Submaxillary Gland of a young Cat. Its lobules are overspread and traversed by an uniform closely arranged plexus of capillaries, the plexus having rounded meshes.
72. Portion of Mucous Membrane of the Palate of a Frog, with its blood-vessels minutely injected. In some parts, the capillaries have a simple plexiform arrangement: in others, they appear knotted or beaded, being provided with short diverticula, or projections from their sides.
73. Portion of Mucous Membrane from the Œsophagus of a Frog, with a simple plexus of capillaries injected.
74. Portion of the Mucous Membrane of an Human Stomach, with its capillary blood-vessels injected. The membrane has a mammillated appearance, with elevations intersected by reticulated depressions. In the meshes of the larger network formed by the capillaries on its surface, the orifices of the gastric tubular glands are seen; and on the cut edges of the specimen, the cavities of some of these glands and the minuter capillaries overspreading their walls.
75. Portion of the Mucous Membrane of the Stomach of a Goat. Its inner surface is covered with cylindrical villiform processes, each containing a loop derived from the subjacent capillary plexus.
76. Portion of the Mucous Membrane of the Stomach of an Eel (*Anguilla*). Its inner surface presents delicate longitudinal folds, and it is traversed by an uniform very close network of minute capillary vessels.

77. Portion of the Stomach of a Mole-Cricket (*Gryllotalpa*).
78. Portion of the Mucous Membrane of an human Jejunum, with its blood-vessels minutely injected. The villi are abundant, very close-set, and of compressed conical shape. Their principal capillary blood-vessels pass in lines converging from their bases to their apices. In some parts, larger spaces appear among the bases of the villi, where a plexus of capillaries, with wide meshes, is adapted to the orifices of the Lieberkuhnian glands.
79. A similar specimen.
80. A similar preparation of the Mucous Membrane of a small intestine, showing more numerous and more closely the orifices of Lieberkuhnian glands. The villi are much lower and broader, and more like small ridges of mucous membrane than those in the preceding specimen.
81. Portion of the Mucous Membrane of a small Intestine. The villi are of more regularly conical and clavate shapes. Their blood-vessels minutely injected, as in the preceding specimens, are arranged in a more reticulate manner. They are obscured by the coverings of epithelium which remain on nearly all the villi, or of which the summits are, in some instances, broken off.
82. Portion of the Mucous Membrane of the Duodenum of a Monkey. Its structures are essentially similar to those shown in Nos. 78 and 79, but the vessels appear even more abundant.
83. Portion of the Mucous Membrane of the small Intestine of a Dog. Its villi are extremely long, slender and cylindriciform, and their capillaries generally reticulated; many of them also are covered with their epithelium.
84. A similar preparation of Mucous Membrane of the small Intestine of a young Pig.

85. Portion of the Mucous Membrane of the small Intestine of a Rabbit. The villi are thickly clavate, or nearly spheroidal; they are set almost regularly in rows, and wide spaces left between the capillaries on their surfaces appear like orifices of tubular glands.
86. Portion of Mucous Membrane of the small Intestine of a Cassowary, having extremely large villi.
87. Portion of the Mucous Membrane of the small Intestine of a Pigeon. Its villi are small and clavate, or cylindriciform, or flattened; the chief capillary blood-vessels ascend in nearly parallel lines from their bases, but at their extremities form an extremely close and regular network.
88. A similar preparation, from near the lower end of the small intestine of a Pigeon. The mucous membrane is elevated in low, zigzag, parallel ridges, which present at their free edges a very close capillary network, and are in some places subdivided into small portions like villi.
89. Portion of the Mucous Membrane of the small Intestine of a young Fowl. In addition to very close-set villi, generally similar to those in No. 87, it exhibits between their bases the orifices of numerous Lieberkuhnian glands.
90. A similar preparation of the Mucous Membrane of the small Intestine of a Tortoise (*Testudo*).
91. Portion of the Mucous Membrane of the small Intestine of a Boa Constrictor. Its large flattened villi are traversed by a close plexus of capillaries.
92. A similar preparation of the villous Mucous Membrane of the small Intestine of a Snake.
93. The junction of the small and large Intestines of a Frog, with their blood-vessels minutely injected.

94. Portion of the Mucous Membrane of an human large Intestine. Its surface presents the orifices of abundant Lieberkuhnian glands, which are arranged so closely that they give it the aspect of a miniature honey-comb. In the reticulated ridges by which the orifices are separated, the capillary blood-vessels are arranged in an extremely delicate and minute plexus. At the edges of the specimen, a similar capillary plexus may be traced extending along the walls of the glands, through the thickness of the mucous membrane.
95. A similar preparation, from a Rectum. Its general characters are like those of the preceding: but the tubular glands are larger and deeper, and their boundaries are more distinct.
96. A similar specimen dried.
97. Portion of the Mucous Membrane of the large Intestine of a Monkey. It resembles No. 94 in all its characters.
98. Portion of the Mucous Membrane of the large Intestine of a Fowl.
99. Portion of the Mucous Membrane of the large Intestine of a Lizard. Its surface is intersected by ridges which divide it in an irregularly reticular manner, and bear a fine capillary plexus.
100. Portion of the Mucous Membrane of the large Intestine of a Snake. Delicate transverse folds, occasionally interrupted and branching, like miniature valvulæ conniventes, contain a very close and delicate plexus of capillaries.
101. Portion of the Mucous Membrane of the large Intestine of a Frog, taken from near its termination, and dried after injection. It exhibits a comparatively wide-meshed capillary network.
102. A similar preparation.



103. Portion of the Liver of a Pig, in which the portal vein was injected with red, the hepatic vein with white, and the hepatic duct with yellow, material. The close and delicate intralobular or hepatic venous plexuses are distinct in the centres of the lobules. The circumferences of the lobules exhibit plexuses injected, in some instances, with red, in others with yellow, material; while, in many instances, two distinct plexuses, filled with these fluids respectively, appear mingled or interlaced.

Prepared and presented by Professor Retzius.

104. Portion of the Liver of a Rabbit, in which the portal capillary plexuses at the peripheries of the lobules are injected with red material, and the intralobular hepatic veins with yellow. The contrast is well shown between the interlobular and intralobular veins; the former giving-off capillaries to two or more lobules, the latter receiving those of only one.

105. Portion of the Liver of a Frog. Its injected blood-vessels exhibit an uniform moderately close capillary network.

106. A similar specimen.

107. Portion of the Surface of the Liver of an Eel. Its principal minute blood-vessels radiate from points which are arranged at nearly regular intervals on the surface of the liver. Between these radiating or stellate vessels the interspaces are traversed by a delicate capillary plexus.

108. Portion of the Thymus Gland of a Cat. Its lobules are over-spread and intersected by an exceedingly delicate capillary plexus, very similar to that of the submaxillary gland of the same animal in No. 71 A.

109. Portion of the Lung of a Calf, in which the air-cells and minute bronchi are filled with white wax. On the surface of each lobule, the air-cells appear like closely placed but distinct rounded vesicles.

Prepared and presented by Professor Retzius.



110. Portion of the Lung of a New-born Child, with the minute capillary plexus on the walls of its air-cells injected.

Prepared by Lieberkuhn. Presented by Professor Retzius.

111. Portion of Human Lung, with its capillaries minutely injected. It shows the nearly abrupt termination of the opaque white lining membrane of the minute bronchi, where they lead, or are continued, into 'intercellular passages' (Rainey). In every part, the air-cells are overspread with an exceedingly close plexus of minute capillaries, by which their various forms and openings into the intercellular passages may be traced.
112. Thin section of injected Human Lung. At the orifices of some of the air-cells, or of the openings of communication between those of a series leading from an intercellular passage, the 'pulmonary membrane' may be seen; that is, the elastic membrane over or between duplicatures of which the capillary plexus is spread.
113. Portion of Human Lung.
114. A similar specimen. Both show the apparently irregular forms and modes of arrangement of the air-cells, and their supply of minute capillary blood-vessels.
115. A similar specimen.
116. A similar preparation of a portion of the Lung of a Monkey. It has the same general characters as the human lung, but the air-cells are smaller, and the capillary plexus even more close.
117. Portion of the Lung of a Dog, exhibiting, especially, the arrangement of the blood-vessels on its pleural surface. At nearly regular intervals, vessels appear passing to the surface of the lung through interlobular spaces; then, at the surface, branching-out in a stellate manner, and having their interspaces filled with an exceedingly close plexus of very minute capillaries.

118. Two portions of the Lung of a Rabbit. One shows a similar distribution of still minuter blood-vessels at the pleural surface ; the other shows a similar capillary plexus, arranged on very minute air-cells.
119. A similar preparation of the Pleural Surface of the Lung of a Rat. Its capillary plexus is as dense as that of the rabbit's lung.
120. A similar preparation of the equally vascular Lung of a Kangaroo. The stellate branching of the vessels passing to the surface of the lung is very distinct.
121. Portion of the Lung of a Rook. Its surface, as well as its interior, is shown ; and, in both, the exceedingly close capillary plexus which characterizes birds' lungs as more vascular than those of any other class.
- 121 A. Portion of the Lung of a Fowl, showing its external surface, at which vessels are seen spreading out in the same manner as in No. 120 and others preceding it. The spaces between these vessels are also similarly occupied by a most dense capillary network.
122. Portion of the Lung of a Tortoise, with its blood-vessels minutely injected by Lieberkuhn.
- Presented by Professor Retzius.
123. Portion of the Lung of a Boa Constrictor, showing the minute reticulation of its internal surface. Beneath the surface, both of the intersecting ridges and of the spaces they enclose, a regular capillary network is spread-out ; but the ridges are very thick in comparison with the partitions between the air-cells of mammalia and birds, and only one surface of each capillary blood-vessel is exposed to the air.
124. A similar specimen of the Lung of a Viper.
125. Portion of the Lung of a Toad similarly prepared. Its

internal surface is more minutely, but less regularly, reticulated and saccular, and its capillary plexus is closer.

126. Branchial Laminæ of an Eel. Each lamina appears penniform, a median laminar stem bearing on its sides a series of opposite, parallel, elongated, semi-elliptical folds or lamellæ. On each side of the median stem a blood-vessel runs, from which branches are derived to each of the lamellæ. In the lamellæ are capillary vessels arranged in as close a plexus as in the most vascular mammalian lung.
127. Separate Branchial Laminæ from an Eel.
128. Portion of the Air-bladder of an Eel. Its internal surface is subdivided by ridges, like those in the saccular lungs of the reptiles, which enclose large angular spaces, and on the surfaces of which is a wide-meshed capillary plexus. In the spaces thus enclosed, the lining membrane of the air-bladder is raised in short folds and villiform prominences, traversed by much more minute, but irregular capillary plexuses.
129. The Gland, so-called, of the Air-bladder of an Eel, displaying its long parallel and straight blood-vessels.
130. Portion of an Human Bronchial Tube, having its internal surface raised in close parallel longitudinal ridges. In its mucous membrane is a capillary plexus, of which the chief vessels are longitudinal, according with the direction of the subjacent elastic fibres.
131. Portion of a Bronchial Tube, in or beneath the mucous membrane of which the capillary blood-vessels are arranged in a wide-meshed rectangular plexus. Around the orifices of branches the plexus is much closer and less angular.
132. Portion of the Trachea of a young Pig, dried after minute injection of its blood-vessels.
133. Portion of an Human Kidney, in which the urine-tubes are

filled with white, and the arteries and Malpighian tufts with red, material. The straight and nearly parallel course of the tubes near the apices of the pyramids, and their tortuous irregular courses at the bases and in the cortical substance, are well shown; as are, also, the close plexuses of the capillaries and the structure of the Malpighian tufts.

Presented by Dr. Griffith.

134. Portion of an Human Foetal Kidney, showing, especially, the abundant Malpighian tufts or glomerules of blood-vessels, and the short afferent and efferent vessels by which they appear suspended.
135. A similar preparation of a piece of the Kidney of a Hedgehog (*Erinaceus*), in which are also shown the almost straight blood-vessels that run between the urine-tubes, near the extremities of the pyramids or cones of the kidney.
136. Section of a Kidney of a Pole-cat (*Mustela putorius*), with the urine-tubes injected.

Presented by Dr. Griffith.

137. Portion of the Kidney of a Dog, showing the plexus of capillary vessels on its free surface. Numerous comparatively long and tortuous vessels enter into the formation of the plexus.
138. Section of the Kidney of a Dog, showing the different arrangement of the blood-vessels in its cortical and its tubular parts. In the former, a very close capillary plexus exists, and is connected with the Malpighian glomerules; in the latter, long and nearly straight vessels are adapted to the course of the straight and simple urine-tubes.
139. Section of the Kidney of a Rhinoceros, with the urine-tubes injected. Their general plan of arrangement agrees with that shown in No. 133.
140. A similar specimen, in which the arteries also are injected.



141. Portion of the Kidney of a Horse, displaying the very close capillary plexus of its cortical substance, and numerous Malpighian tufts or glomerules, each of which is surrounded by a dark space, probably representing the capsule in which it is enclosed.

142. A similar preparation of the Kidney of an Ass.

143. Portion of a Kidney, in which the capillary plexus is injected from the veins.

Prepared and presented, with the four preceding specimens, by Professor Owen.

144. Portion of a Kidney of a Rabbit, having its urine-tubes injected with white, and its arteries with red, material.

145. Portion of the Kidney of a Musk-deer. In adaptation to the size of the blood-corpuscles (see No. 3), its blood-vessels are extremely small. They form a close plexus. Many Malpighian glomerules are shown, which are as large as the average size of those in preceding specimens, and some of which appear as enclosed in Malpighian capsules.

146. Portion of a Kidney of a Frog. That which is naturally the posterior surface of the kidney is here placed above: it presents a moderately close capillary plexus, many of the vessels in which are comparatively long and undulating, as in No. 137. At the back of the specimen, which shows the anterior surface of the kidney, and at its convex border, many Malpighian glomerules are seen enclosed in their capsules. Each capsule appears surrounded by a very dense plexus.

147. Portion of Human Pia Mater, with its blood-vessels injected.

148. Portion of a Plexus of Blood-vessels, from the base of the brain of a Frog. In part of the plexus the vessels are tortuous and large and anastomose freely, as in a rete mirabile.

149. Portion of the Mucous Membrane of a Cat's Nose, with a close capillary plexus of blood-vessels injected in its folds.



150. Portion of the Retina of an Ox, with its blood-vessels minutely injected.
151. Portion of the Choroid Membrane, Ciliary Ligament, and Ciliary Processes, of the Eye of an Human Fœtus. In the choroid membrane and the ciliary processes, the injected plexus of capillary blood-vessels is closer than in any of the preceding specimens, the blood-vessels being very narrow, and the meshes of their reticulations even narrower than themselves. In the ciliary ligament the chief capillary vessels run in nearly parallel lines from its outer to its inner border.
152. A similar preparation of the Choroid Membrane of a young Dog.
153. A similar preparation of the Ciliary Processes of a Dog.
154. A similar preparation of the whole circle of the Ciliary Processes of a young Dog.
155. Portion of a Cat's Tongue, showing its papillary surface after minute injection of the blood-vessels. Many of the papillæ retain their coverings of opaque white epithelium. Others, from which this is removed, appear as slender, conical, or cylindric processes, grouped in circles close together, and each receiving a loop of capillary blood-vessels from the subjacent plexus.
156. A similar preparation from the posterior part of a Cat's Tongue. Large, conical, recurved papillæ are shown, traversed by a dense plexus of capillary blood-vessels; and two 'papillæ circumvallatæ.' Each of these consists of an elevated ring of vascular mucous membrane, within which is a narrow fossa, that encircles a discoid elevation covered by very short and slender papillæ.
157. Portion of the Mucous Membrane of the Tongue of a Dog. It displays circular groups of delicate papillæ, like those in No. 155; and, distantly placed among these, others that are

higher and collected in a single, solid, compound papilla. Among the bases of the papillæ is a wide-meshed capillary plexus, from which their vessels are upraised in loops.

158. A similar preparation of a portion of the Tongue of a Fœtal Lamb. The papillæ nearly resemble those last described; but part of them are still covered with their epithelium, and both their blood-vessels, and those of the mucous membrane at their bases, are shown with remarkable distinctness.

159. Portion of the Skin of a Child's Forehead, dried after the minute injection of its blood-vessels, which present the appearance of a close but irregular plexus, the blood-vessels of the several layers of the skin having collapsed in drying.

160. A similar preparation of Fœtal Skin.

161. A similar preparation of the Skin of a Pig, with fasciculi of nerve-fibres shown on its inferior surface.

162. A vertical section of Human Skin, dried after the injection of its blood-vessels. At its free surface are the looped vessels of the close-set papillæ; beneath these, corresponding with the superficial compact layer of the cutis, is a very dense but confused capillary plexus: and beneath this, extending through the layer of cellular and adipose subcutaneous tissue, a more wide-meshed plexus.

163. A similar specimen, showing also the fine capillary plexuses in the walls of several hair follicles.

164. A similar specimen.

Prepared and presented by Robert Liston, Esq.

165. Part of the Web of a Frog, with its blood-vessels minutely injected. They form a single wide-meshed plexus, the skin having neither papillæ nor glands added to its proper structure.

166. A similar specimen.
167. Portion of the Ball of a Finger. The minute injection of the blood-vessels shows the double rows of papillæ, raised in nearly parallel curved ridges, and separated by grooves. In general, each papilla receives a single loop of tortuous capillary vessels; but many of the papillæ appear doubly or triply pointed, and in these a loop passes into each point.
168. A similar specimen.
169. A similar preparation of a portion of the Palmar surface of a Monkey's finger. The papillæ are long and slender; part of them are still nearly covered with epidermis, through which only their vascular summits can be seen.
170. Vertical section of the Skin of a Porpoise (*Phocæna*), showing the very long and slender papillæ on its surface, and their contained vascular loops.
171. Vertical section of the Skin of an Human Foot. Sweat glands and their ducts are shown; the latter running spirally through the epidermis, and nearly straight through the cutis, and then terminating in the convolutions of which the round mass of the gland is composed.
172. Portion of the Palmar Surface of the Finger of a Fœtus, with its blood-vessels minutely injected. The double rows of vascular papillæ are shown as in Nos. 167, 168; and in the lines between the papillæ of each double row, the orifices of many sweat-glands.
173. The inferior surface of a portion of Skin. In the midst of the plexus of blood-vessels belonging to the proper substance of the skin, those of several sweat-glands are seen. They may be recognized by their forming an exceedingly close and delicate plexus in a space circumscribed in accordance with the shape of the gland.

174. Vertical section of the Skin of a Dog's Foot, showing the blood-vessels of the papillæ, of the sweat-glands, and of some lobules of fat.
175. Portion of Skin from the back of the Hand of a Monkey. On part of it is a papillary structure; on the other part, the orifices of numerous hair-follicles are seen, with hairs projecting from them, and the tortuous capillary vessels forming a plexus around them.
176. Portion of Skin from the Ear of a Cat. Its inferior surface is shown, with the very vascular hair-follicles, to the bases of which the hairs descend and enlarge upon their pulps. In some instances the vascular bases of the pulps are also seen.
177. Vertical section of Skin from an Ass, with numerous hair-follicles, dried after minute injection of the blood-vessels.
178. Vertical section of Skin from a Sheep. The blood-vessels of several hair-follicles are shown, forming on their walls a very delicate capillary plexus, in which the principal vessels are at right angles with the axis of the follicle.
179. Separate Hair-Follicles from a Sheep, showing a minute capillary plexus injected in the conical pulp, which is seated at the base of the hair-follicle. The follicle is itself encircled by vessels similar to those shown in the preceding preparation.
180. Portion of the Skin of a Fowl, with its blood-vessels minutely injected.
181. Portion of Skin from beneath a Nail, with the skin that covers the root of the nail turned back. The free edge of this reflected portion of the skin has papillæ, with loops of capillary blood-vessels; the part which is in contact with the upper surface of the nail presents on its surface a very close and minute capillary plexus. Beneath the lunula, or opaque



white part of the nail, are papillæ irregularly and rather distantly placed. In front of these is a narrow band, in which is a wide-meshed capillary plexus; and in front of this, beneath the body of the nail, are very thin ridges or laminæ, formed of linear series of slender, close-set, and apparently continuous papillæ. At the extremity of the attachment of the nail the skin presents again the common papillary surface.

182. Portion of the Margin of the Skin covering the lunula of a Nail, with its blood-vessels injected, as in the preceding specimen.
183. Portion of the Skin, which formed the matrix of the thick cuticular covering of the hoof of a Pig. Its surface is covered with long, sharp-pointed, and slightly curved conical papillæ, each of which encloses an extremely minute plexus of capillary blood-vessels. The general direction of the chief vessels of the plexus is parallel with the axis of the papilla.
184. A similar preparation of the Papillæ of the Matrix for forming the hoof of an Ass. Their general characters are similar to those of the papillæ last described; but they are longer and more slender.
185. Whisker-hairs of a Mouse.
186. Dark and Light Hairs from a Sable.
187. Hairs of an Ornithorynchus.
188. Portion of the edge or fringe of a Synovial Membrane, with free narrow processes, like papillæ, receiving loops of blood-vessels.
189. Portion of a Fringe of Synovial Membrane from the sheath of a tendon. The processes shaped like papillæ on the edges of the fringe are covered with thick layers of epithelial cells,



and enclose loops of very tortuous and recurving capillary vessels.

190. Spermatic Filaments (Spermatozoa) of a Rhinoceros.
191. Section of the Os Penis of a Walrus (*Trichecus Rosmarus*).
192. Portion of the external surface of an Human Uterus. It displays a very close plexus of capillary blood-vessels, the chief of which are directed longitudinally, in adaptation probably to the course of the muscular fibres and fibro-cells.
193. Portion of the Lining Membrane of the Uterus of a Wolf.
- 193 A. A similar preparation, from a Sheep.
194. Portion of the Mucous Membrane of the unimpregnated Uterus of a Sow. Its folds contain a very delicate plexus of minute capillary vessels. Many of its follicles, also, are shown at the back of the preparation as opaque white tortuous tubes.
195. Portion of the Mucous Membrane of the impregnated Uterus of a Sow. In comparison with the preceding, its inner surface is much more minutely folded and wrinkled; the edges of the wrinkles are generally crenate or papillary; and they contain a capillary plexus which is much more close than that shown in the preceding. The orifices of several follicles may be seen, whose tortuous tubes are shown at the back of the specimen.
196. Portion of Human Placenta. The fine branching and tufted processes or villi of the chorion contain minute blood-vessels, which generally pursue a very tortuous course, and in each of the villi form a convoluted loop. The trunks of the veins are much larger than those of the arteries.
197. Portion of Skull from a patient who had *Mollities Ossium*. It is, throughout, of porous spongy texture. The corpuscles

or lacunæ are small and irregular, with few or no canaliculi, and in many instances clear, as if empty.

198. 'Osteosclerosis fibulæ hominis.'

Presented by Dr. Hannover.

199. Vertical sections of the Thickened Skull of a Lunatic.

200. Section of an Emphysematous Lung, in an early stage of the disease. With the dilatation of air-cells, and the wasting of partitions between them, there is a general decrease in the vascularity of the lung. The capillary plexuses on the walls of the air-cells are more widely-meshed, while the vessels themselves are of less than natural diameter.

201. Section of an Emphysematous Lung in an advanced stage of the disease. Cavities easily visible to the naked eye are formed by the coalescence of air-cells whose walls and partitions are wasted; and the walls of these cavities are over-spread by a wide-meshed irregular plexus, in which comparatively few capillaries are derived from the remaining larger vessels.

The conditions shown by these specimens are described by Mr. Rainey in the "Medico-Chirurgical Transactions," Vol. xxxi. p. 297.

202. Section of a Tuberculous Human Lung. The tuberculous matter forms small solid opaque whitish masses, which completely occupy the place of portions of the proper tissue of the lung. The membranes of the air-cells, and the other tissues of the tuberculous portions of the lung, appear to have been removed during the deposit of the tuberculous matter. No blood-vessels exist in the tubercles, except such as remain from those of the interlobular tissue of the lung not yet removed. The substance of the lung around the tubercles appears healthy.

203. A similar specimen.

204. A similar specimen from a Monkey.

205. Portion of a Diaphragm, with fatty degeneration of its muscular fibres.

Presented by Arthur Stretton, Esq.

206. Portion of an Ovarian Cyst, in which the capillary and other small blood-vessels are irregularly dilated or varicose.

Prepared by Professor Harting. Presented by Dr. van Leeuwen.

207. Portion of False Membrane, formed from blood effused in the arachnoid sac. Its blood-vessels are minutely injected; they form an irregular wide-meshed plexus.

Prepared and presented by Henry Grav, Esq.

208. A similar specimen.

Prepared and presented by Holmes Coote, Esq.

209. Crystals of Cholestearine from the fluid of a chronic abscess, the contents of which appeared to be serum with a very small quantity of pus-corpuscles, and an abundance of these crystals.

210. Section of a Tooth from an Ovarian Cyst in a Mare. It has the perfect dental structures.

Presented by Professor Symonds.

211. Fragments of a Fibro-plastic Tumour from an Upper Jaw. It exhibits both the structures characteristic of this form of tumour; namely, elongated or fusiform nucleated cells (fibro-plastic cells of Lebert), and oval cells, or masses of blastema, containing many nuclei.

212. Sections of a Loose Cartilage from a Knee-joint. It has a normal cartilaginous structure, with a somewhat fibrous inter-cellular substance.

- 213, 214, 215. Sections of a large Cartilaginous Tumour connected with the Head of a Tibia. They show, even in the same section, many of the various forms of cartilaginous tissue, including that with numerous stellate nuclei.

216. Section of a Tumour in the lower end of a Fibula. It contains a mixture of cartilaginous and, apparently, fibro-plastic tissue.
217. Section of a Tumour which was situated over the parotid gland. It contains a mixture of cartilaginous and, apparently, glandular tissue.
218. Section of a similar and similarly situated Tumour. In all these specimens the cartilage exhibits some stellate nuclei.
- The tumours from which the eight preceding specimens were taken are preserved in the Museum. See MS. Appendix to the Pathological Catalogue.
219. Section of a large ivory-like Osseous Tumour in the orbit. In the hardest parts there are neither Haversian canals nor lacunæ; in the less hard parts, the canals are very large, and the lacunæ are not arranged in circles around them; and every where the lacunæ are of irregular or distorted forms.
- Presented by Professor Clark. The tumour is in the Museum of the University of Cambridge.
220. Section of a similar Tumour, removed from a Girl's mastoid process. The lacunæ are perfectly formed, and very large; arranged in some parts closely, in some very widely apart. Where there are Haversian canals, there are generally a few lamellæ around them, and between these, lacunæ are placed, as in the normal state.
221. Section of Bone from the interior of a Medullary Tumour on a Femur. It is cancellous, but well-formed and hard; its lacunæ and their canals are of normal characters.
222. A Layer of Conferva discharged from the Intestines.
223. A similar specimen.
224. Portions of Hair, from a case of 'Porrigo decalvans.'

225. Mucus-cells containing black pigment-granules; from the expectoration of chronic bronchitis.

226. Itch-parasites from an Horse (*Sarcoptes Equi*).

227. Ovules of a Parasite of the Liver of a Rabbit.

Presented by Dr. van Leeuwen.

228. *Trichina Spiralis*, in Human Muscle.

229. Uric Acid Gravel.

230. Crystals of Uric Acid; from a patient with pleurisy.

231. A similar specimen.

Presented by Arthur Stretton, Esq.

232. Fusiform Crystals of Uric Acid.

233. Rectangular Crystals of Uric Acid.

234. Striated Crystals of Uric Acid.

235. Crystals of Uric Acid in Aigrettes.

236. Uric Acid, from Gout-stones.

236 A. Crystals of Urate of Magnesia.

237. A similar specimen.

Presented by Arthur Stretton, Esq.

238. Urate of Soda, from Gouty Deposit.

239. Crystals of Hippuric Acid, from the Urine of the Cow.

240. Crystals of Oxalate of Soda.



241. Octohedral Crystals of Oxalate of Lime.
242. Crystals of Triple-phosphate, or Phosphate of Ammonia and Magnesia.
243. Crystals of Carbonate of Lime, from the Urine of the Horse.
244. Similar Crystals of Carbonate of Lime, from Human Urine.  
Presented by Arthur Stretton, Esq.
245. Crystals of Murexide.
246. Palate of a Chiton.  
Presented, with the seven following specimens, by J. W. Wilton, Esq.
247. Gastric Teeth of a Chiton.
248. Palate of a Trochus.
249. Gastric Teeth of a Trochus.
250. Gastric Teeth of a Nerita.
251. Gastric Teeth of a *Doris tuberculata*.
252. Palate of a Periwinkle (*Turbo*).
253. *Cellularia ciliata*.
254. Sting of an Hornet.
255. Transverse section of Cocoa-nut Shell. Its cells, nearly filled-up with sclerogen, retain central cavities and branching canals, resembling the lacunæ and canaliculi of bone.

MODELS, CASTS,  
DRAWINGS AND DIAGRAMS.



# MODELS AND CASTS

OF

## NATURAL STRUCTURES.

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THE following are arranged so as to correspond with the Physiological Series described in this volume.

Brain and nerves, 1 to 7.  
Eye, 8 to 10.  
Ear, 11 to 22.  
Skull and Skeletons, 23 to 38.  
Miscellaneous, 39 to 43.  
Development of the Embryo, 44 to 60.

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1. Cast of an Adult Human Brain.

Presented by A. M. McWhinnie, Esq.

2. Model, enlarged, of the Base of a Brain and the origins of the cerebral nerves.

3. Model of the right half of a Brain, showing the parts exposed by a section in the median line, passing between the cerebral hemispheres, and through the corpus callosum, fornix, and other parts.

Presented by Lowe Wheeler, Esq.

4. Model of the right half of a Brain, in which, after a section like that represented in the preceding model, two sets of lamellæ of fibres were dissected; namely, those which extend outwards from the corpus callosum, radiating into the cerebral hemisphere; and those which cross them, radiating upwards and outwards from the thalamus opticus and corpus striatum, and then curving inwards.
5. Model of part of a Brain, intended to show especially the following parts, namely:—(1) the white disc-shaped nuclear substance of the cerebellum; (2) proceeding from it, the superior crura of the cerebellum (processus a cerebello ad testes); (3) between these, the valve of Vieussens; (4) the fillet of Reil, exposed on the right side, and on the left partially covered by the corpora quadrigemina; (5) the commissure of the corpora quadrigemina.
6. Model of a Brain, in which, after a median section from below, the several parts have been put asunder, so as to expose, especially, the cavities of the lateral ventricles, the inferior surface of the corpus callosum, the fissure of Sylvius, and the island of Reil.

The three preceding models were made from dissections by Reil.
7. Model of the Otic Ganglion on the inferior maxillary division of the fifth or trifacial nerve, and of the branches to and from it. The following parts are also shown, namely; the pterygoid muscles; the trunk, ganglion, and three divisions of the fifth nerve; the knee-shaped bend of the facial nerve; the petrosal nerves; the corda tympani; the internal maxillary artery, and the branches of the sympathetic nerve associated with it.
8. Model, enlarged, of the structures of the Eye, as shown in a vertical section from before backwards.
9. Model of the principal contents of the Orbits, and of the trunks of the nerves supplying them. The several parts are shown



in a more superficial view on the right side, and in a deeper view on the left.

10. Model of an Eye, as seen in a vertical section.

Made and presented by W. H. Clift, Esq.

11. Cast in metal of the Cavities of an Ear, and of the canals for nerves and blood-vessels that communicate with them.

Made and presented by John Havers, Esq.

12. Model of all the principal parts of the Ear.

In this and in all the other models of the ear the parts are represented as in various degrees magnified.

13. Model of the Membrana Tympani, with the ossicles of the tympanum and its muscles.

14. Model of all the principal parts of the Ear, and of the nerves distributed to them, or passing through them.

Presented by Lowe Wheeler, Esq.

15. A similar Model.

16. Model of the osseous parts of the Cochlea, semicircular Canals and Vestibule, with the foramen rotundum and foramen ovale.

17. Model of the same Parts, showing also the internal auditory passage and the cavity of the cochlea.

18. Model of the same Parts, with all their cavities laid open.

19. Model of the same Parts, with the membranous parts of the vestibule and semicircular canals, and the lamina spiralis of the cochlea.

20. Model of the same Parts, with the trunks of the facial and auditory nerves.

21. Model, in clay, of the osseous parts of the Vestibule, Cochlea, and semicircular Canals.
22. Model, in clay, of the interior of the osseous parts of the Vestibule and semicircular Canals.
23. Cast of the Skull of Raphael D'Urbino.
24. Cast of the Skull of Thurtell, the murderer.
25. Cast of the Skull of a Woman of Lapland.
26. Cast of the Skull of a Lapland Girl, three years old.
27. Cast of the Skull of a Man of Finland.  
The three preceding casts were presented by Professor Retzius.
28. Cast of the Skull of a Carib.
29. Cast of the upper part of a singularly elongated Skull : from a boy ten years old.
30. Model of the Head of an African Negro.
31. Model, enlarged, of a Sphenoid Bone.
32. Model, enlarged, of a Palate Bone.
33. Model of the Skull of a young Chimpanzee.
34. Model of the Head of the same Chimpanzee.
35. Cast of the Head of a Dodo (Didus).

Presented by the Reverend Mr. Duncan.

36. Model of a Horse's Foot, the deeper parts being exposed by the removal of half the hoof.

37. Model of a vertical section of a Horse's Fore-Leg.
38. Cast of the Pelvis of a Megatherium.
39. Model of the Male Pelvic Organs, as displayed in a side-view of the pelvis.
40. Model of the same Parts, together with the principal vessels and nerves of the pelvis and thigh, and the parts concerned in inguinal and femoral herniæ.
41. Model of the Muscles in the Male Perineum.
42. Another Model of the same muscles.
43. Model of a Mammary Gland, showing some of the principal lactiferous tubes.
- 44 to 51. Models of eight Human Embryoes, showing, at intervals of one week, the changes by developement from the age of two to that of nine weeks.
- 52 to 60. Models of the Heads of nine Human Embryoes, illustrating the developement of the face between the ages of three and nine weeks.

These and the preceding models were made by Dr. Kahn, from specimens and drawings belonging to the late Professor Erdl of Munich. Fuller descriptions are placed in the cases with them.

MODELS AND CASTS  
OF  
CONGENITAL MALFORMATIONS.

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Double monstrosity, 1, 2.  
Ectopia vesicæ, 3 to 6.  
Malformations of the Brain, 7 to 15 a.  
Spina bifida, 16.  
Malformations of limbs, 17 to 28.  
„ „ genital organs, 29 to 32.  
Miscellaneous, 33 to 35.

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A. 1. Cast of a Double Fœtus. The Skeletons are preserved in the Series of Congenital Malformations, No. 1, and described at p. 185 of this volume.

A. 2. Model of a Chinese, to whose body that of a Male Child is attached.

“A-Ke was born sixteen years ago, with another male child of nearly the same size united to the pit of his stomach by the neck, as if his brother had plunged its head into his breast. The skin of the principal here joins that of the upper part of the neck of the parasite quite regularly and smoothly, excepting the superficial blood-vessels, which appear somewhat turgid. The sufferings of the mother were so great, that she survived the birth of this monster only two days. Since that time, the parasite has not much

increased in size, and, at present, is not much larger than new-born infants usually are ; but the bones are completely formed."—Edinburgh Philosophical Journal, Vol. v. and Vol. vii.

Presented by Henry Earle, Esq.

- A. 3. Cast of parts connected with a malformation named Ectopia vesicæ and Epispadias. A fissure existed in the lower part of the anterior wall of the abdomen, in the anterior wall of the bladder, and along the upper part of the penis. The mucous membrane of the bladder, bright red with vascularity, protruded through the aperture in the abdominal walls.
- A. 4. Model of a similar malformation in a Boy four years old. The penis is very small, and is nearly sunk in the integuments, between two swellings produced by congenital inguinal herniæ.
- A. 5. Cast of an exactly similar malformation in an older person.
- A. 6. Model of a similar defect of the Anterior Walls of the Abdomen and of the Urinary Bladder, with protrusion of the posterior wall of the bladder, in a Girl fifteen years old.
- A. 7. Cast of the Head of the Idiot Girl whose skull is preserved in Series A, No. 122, and described at p. 205 of this volume.
- A. 8. Model of the Brain of the same Idiot. See p. 205 of this volume.
- A. 9. Cast of the Head of the Idiot, whose skull is preserved in Series A, No. 124, and described at p. 206 of this volume.
- A. 10. Cast of the brain of the same Idiot. See p. 206.
- A. 11. Cast of the Head of an Idiot twenty-six years old, with defective size of the brain and skull.



A. 12. Cast of the Brain of an Idiot twenty years old. A large part of the posterior lobe of each cerebral hemisphere is replaced by a cavity filled with fluid.

A. 13. Cast of the same Brain, with the posterior lobes of the cerebral hemispheres deeply sunken after the evacuation of the fluid.

Presented, with the preceding, by Haly Holme, Esq.

A. 14. Cast of a Fœtus, with hydrocephalus.

Presented by Dr. Hugh Ley.

A. 15. Cast of part of a Child which lived several weeks with a tumour nearly as large as its head projecting from its occiput. The tumour contained the greater part of the cerebrum, covered with dura mater, and continuous with the rest of the brain through a fissure in the median line of the occipital bone.

Presented by — Forster, Esq.

A. 15 a. Cast of a Child's Head, with a spherical Tumour larger than itself, united by a kind of stem to its occiput. The tumour contained fluid, which communicated with that within the child's head.

A. 16. Cast of the Back of a Child three years old, with a large Tumour, connected with spina bifida, in the sacral and lower lumbar region.

Presented by Dr. Cape.

A. 17. Cast of the Fœtus, with 'Sireniform' monstrosity, which is described at p. 215 of this volume. The defectively formed lower limbs are united in a single conical stump, proceeding from a narrow pelvis. The hands also are at right angles with the fore-arms.

A. 18. Cast of the same Fœtus, with the conical stump laid flatly on the anterior surface of the abdomen, in the position in which it seemed to have lain in the uterus.

A. 19. Cast of a Hand, with congenital absence of the third and fourth fingers, and union of the first and second fingers in their whole length.

A. 20. Cast of a Hand, with a supernumerary Thumb.

Presented by B. Barrow, Esq.

A. 21, 22. Casts of a Man's Hands. On each hand there are two thumbs of unequal size; on each, a scar at the base of the little finger marks the place from which a supernumerary finger was removed; on each, the first, second, and third fingers are united in their whole length, and the third and fourth fingers are partially united.

A. 23, 24. Cast of the Feet of the same Man. On each foot there is, on the inner side, a supernumerary metatarsal bone, at the end of which is a cicatrix remaining after the removal of a supernumerary great toe. On each foot, also, the first four toes are united in their whole length.

A. 25. Cast of the Leg and Foot of one of the sons of the man from whom the four preceding casts were taken. There is a supernumerary great toe, and the second, third, and fourth toes are united. The heel is drawn up, and the sole turned inwards, and deeply arched.

A. 26. Cast of the Leg and Foot of one of the daughters of the same man. It shows exactly the same deformities as the last, except in that only two of the toes are united.

A. 27. Cast of the Hand of the Child from whom the preceding cast was taken. It has a supernumerary little finger; the first three fingers are united in their whole length, and the third and fourth as far as to the ends of their first phalanges.

The father of the man from whom the casts A. 21, 22, 23, 24 were taken had double thumbs, and six toes on each foot. His wife had no malformation. They had eight children, of whom five were well-formed; but three had supernumerary thumbs, fingers, and toes, and unnatural union of the latter.

The man from whom the casts were taken, had four sons well-formed, and two sons and two daughters with malformations more or less similar to his own, and combined with club foot. The casts A. 25, 26, 27 were taken from two of these children.

The series of casts were presented by Dr. Baly.

- A. 28. Cast of a Man's Hand, in which the first and second fingers are of immense size, and are united to the ends of their first phalanges. The second finger is six inches long, and at its last phalanx is six and a half inches in circumference. It is curved towards the radial side, and nearly covers the third and fourth fingers.

Presented by T. B. Curling, Esq.

- A. 29. Cast of the external Genital Organs of an imperfectly formed Male. The scrotum is divided into two portions, each of which contained a testicle. The urethra is incomplete, and opens in the perineum. The penis is small and recurved.

Presented by George Mæilwain, Esq.

- A. 30. Model of a similar malformation. It presents a more feminine appearance of the male organs; the halves of the scrotum being smaller, and more wide apart, look like labia; the wide perineal orifice of the urethra looks like a narrow opening into a vagina; and the very small penis might be mistaken for a large clitoris. The testicles, with spermatic cords, were distinctly felt in the two portions of the scrotum.

The person from whom this model was taken wore the dress of a woman.

- A. 31. Cast of the Face of the person from whom the preceding model was taken.

- A. 32. Model of a Double or Bifid Uterus, described by Dr. Robert Lee in the seventeenth volume of the "Medico-Chirurgical Transactions."

A. 33. Model of a Human Fœtus, apparently acephalous, and in every internal part mis-shapen. This fœtus was born with one that was well formed.

A. 34. Cast of part of a Child with a Congenital Tumour attached to the pelvis.

The parts are preserved in Series A. No. 178, and described at p. 220 of this volume.

A. 35. Cast of the Leg of a Child twelve years old, with a deep circular constriction at the lower part of the calf. This constriction existed at the time of birth, and the surface of the skin over it was like that of a cicatrix.

It is probable that the constriction was caused by the umbilical cord, or a band of false membrane, drawn tightly round the leg, as in the cases of intra-uterine amputation of the limbs. The parts above and below the constriction were natural, and all the movements of the foot were perfect.

MODELS AND CASTS

OF

DISEASED OR INJURED PARTS.

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Diseases of bones, 1 to 11.  
„ joints, 12 to 15.  
Injuries of bones and joints, 16 to 34.  
Injuries and diseases of the Spine, 35 to 42.  
Distortions of the Pelvis, 43 to 51.  
Diseases of bursæ and sheaths of tendons, 52 to 55.  
Distortions of Feet, 56 to 63.  
Injuries and diseases of the Brain, 64 to 67.  
Diseases of skin and integuments, 68 to 72.  
„ Organs of Circulation, 73 to 77.  
„ Organs of Digestion, with Herniæ, 78 to 99.  
„ Mouth, &c. 100, 101.  
„ Organs of Generation, 102 to 110.  
Tumours, 111 to 117.  
Concretions, 118 to 130.  
Results of operations, 131 to 136.  
Miscellanea, 137 to 147.

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1. Cast of a Lower Extremity. The femur was surrounded by the large tumour, of which part is preserved in the Pathological Series 1. 22, Catal. Vol. i. p. 8.
2. Cast of a Lower Extremity. The femur was surrounded by the large tumour, of which parts are preserved in the Pathological Series 1. 26, 27, Catal. Vol. i. p. 9.



3. Cast of the Thigh and part of the Pelvis from which the portions of cartilaginous and osseous tumour were taken, which are preserved in the Pathological Series 1. 118, and A. 133, Catal. Vol. i. pp. 28, 80.

4. Cast of a Face, deformed by a disease originating in the antrum.

5. Model of a Head, with a very large cartilaginous tumour involving the whole of the lower jaw.

The diseased parts are in the Museum of the Royal College of Surgeons; Pathological Collection, No. 1034. The patient was a lady forty years old, in whom the tumour, commencing below the first right molar teeth, had been growing for eight years.

6. Cast of the Head of a Child, with a tumour in the face produced by a preternatural growth of the superior maxillary bone. The growth had existed from birth.

7. Model of a Tumour originating in the antrum.

8. Model of a Leg, with epithelial cancer, which, originating probably in the skin, had now involved the periosteum over the front of the tibia. The diseased parts are preserved in the Pathological Series 1. Nos. 126, 127, Catal. Vol. i. p. 29.

9. Model of a Leg, showing the further progress of a similar disease. The cancerous growth has its base in the cancellous tissue and posterior wall of the tibia, the superjacent parts having been destroyed by it. The diseased parts are in the Pathological Series 1. Nos. 124, 125, Catal. Vol. i. p. 29.

10. Cast of a Head, in which the bones are extremely thickened, with change of structure similar to that shown in the Pathological Series 1. No. 36, Catal. Vol. i. p. 11.

11. Cast of a Head, with a great cartilaginous and osseous tumour,

involving and extending far over the right superior maxillary bone.

Portions of the disease are in the Museum of Guy's Hospital; and the case is related by Mr. Morgan in the Guy's Hospital Reports.

12. Cast of a Knee-Joint, swollen by the accumulation of fluid within its cavity. The surface of the swelling is unequal, because of the unequal resistance of the parts around the joint; and it appears divided by depressions extending outwards from the sides of the patella, and downwards from its lower margin to the tibia. The outline of the patella, raised by the fluid in the joint, can be traced.

13. Cast of a Knee-Joint, greatly enlarged by chronic disease, probably affecting chiefly the synovial membrane and the ligaments.

The patient had the power of dislocating his leg in any direction at will.

14. Cast of the Knee-Joint of an Adult. During disease in childhood, the bones of the leg were dislocated, moving directly backwards from their connexion with the femur. The tissues about the joint were atrophied and contracted.

15. Cast of the Bones of a Hip, with dislocation of the femur in consequence of disease of the joint. The head of the femur rests on the surface of the ilium, directly above the acetabulum.

16. Cast of a Shoulder, with the head of the humerus dislocated upon the dorsum of the scapula. The head of the humerus rested against the inferior surface and outer edge of the spine of the scapula, its anterior edge being worn in adaptation to the posterior margin of the lower half of the glenoid cavity.

The dislocation occurred long before death. The humerus was also fractured in the middle of its shaft. The bones are preserved in the Pathological Series, c. 79. In Vol. i. p. 160, this cast is referred to as No. 76.

17. Cast of a Shoulder, with the head of the humerus recently dislocated upon the infra-spinous fossa of the scapula.

18. Cast of a Shoulder, with the head of the humerus dislocated into the axilla.

19. Cast of a Shoulder, with an old dislocation of the humerus, the head of the bone lying immediately below the coracoid process of the scapula.

The parts are preserved in the Pathological Series 3. No. 112. Catal. Vol. i. p. 142.

20. Cast of an Elbow, with the radius and ulna dislocated on the posterior surface of the lower end of the humerus.

21. Cast of an Adult Elbow, with a prominence at the outer part of the joint, due to a dislocation of the head of the radius, which occurred in early life. The head of the radius appears to have been in relation with the outer surface of the external condyle of the humerus; but the motions of the joint were perfect.

22. Cast of a Fore-arm and Hand, with deformity of the Wrist, connected with fracture of the radius an inch from the joint, and separation of the triangular fibro-cartilage from its radial attachment.

The parts are in the Pathological Series 3, No. 89. Catal. Vol. i. p. 135.

23. Cast of the Fore-arm and Hand of a Woman in whom the hand was dislocated from the radius and ulna in early childhood. The ulna projected far backwards, and the little finger diverged from the rest, directed backwards and inwards. It was not known whether the dislocation were produced by violence or in consequence of disease.

24. Cast of the Bones of a Hip-joint. The head of the femur, long before death, was dislocated on the foramen ovale, and now projected, with a considerable prominence, into the cavity of the pelvis.

25. Cast of the Bones of a Hip-joint, from a gentleman who, several years before death, received a severe injury of the hip in a fall, and remained lame. Much doubt existed, during

life, respecting the nature of the injury sustained. The condition of the bones shown by the casts is such as would result from long-continued inflammation, producing deposit of bone upon the head of the femur and the borders of the acetabulum.

26. Cast of a Knee, with dislocation of the tibia and fibula inwards.

Presented by Martin Coates, Esq.

27. Cast of a Knee fourteen years after fracture of the patella. The portions of the patella are four inches apart, and, in the bent position of the joint, the condyles of the femur project between them.

The strength and movements of the joint were not impaired.

28. Cast of a Knee, with the patella dislocated on the outer surface of the external condyle of the femur.

The dislocation had long existed. The parts are in the Pathological Series 3. 111. Catal. Vol. i. p. 141.

29. Cast of a Knee, in which it was presumed that displacement of the internal semilunar cartilage had been produced by external violence. Over the situation of the cartilage there is a deep crescentic depression of the integuments.

The patient was knocked down, and fell with his left leg bent under him; and from that instant was unable to bear on the limb. In examining the limb, while the knee was bent to its utmost, a sudden crack was heard, the depression of the integuments on the inner side of the joint disappeared, and the mobility of the joint was restored.

30. Cast of a Leg, with dislocation of the Foot straight backwards from the ankle-joint, and fracture of the fibula a short distance above its malleolus.

31. Cast of an Ankle-joint, with a similar dislocation.

32. Cast of a Foot, which had been dislocated outwards, with, probably, fracture of the internal malleolus and fibula. After



the usual treatment, the form of the limb appeared to be firmly restored. But the patient returned too early to his work as a lamp-lighter, and very gradually his foot was again displaced; yet without great damage to his power of progression.

33. Cast of a Leg, with great deformity at and above the ankle-joint, in consequence of comminuted fracture of the lower ends of the tibia and fibula, and the accumulation of bone in the repair of the injury.

34. Cast of an Ankle, with such deformity as might be produced by partial dislocation of the foot forwards. The exact nature of the injury was not ascertained.

35. Cast of a Back, with irregular prominence of the spinous processes of three lumbar vertebræ, in consequence of fracture of the spine.

36. Cast of a Back, after a similar injury, producing prominence of the spinous processes of the two upper lumbar vertebræ.

37. Cast of a Back, after similar injury, and displacement of one or more dorsal vertebræ.

The patient recovered from the injury.

38. Cast of the Back of a Child, with angular curvature of the lumbar portion of the spine, in consequence of disease.

39. Cast of a Back, with a large abscess connected with disease and angular curvature of the lower dorsal vertebræ.

Presented by R. A. Stafford, Esq.

40. Cast representing a Lumbar Abscess projecting at the upper and inner part of the thigh.

41. Cast representing a Lumbar Abscess projecting at the upper and outer part of the thigh.



42. Cast of the upper part of a Thigh, with a Swelling produced by lumbar abscess, and mistaken for a femoral hernia.

From the person part of whose spine is in the Pathological Series 4, No. 31.

43. Cast of a Female Pelvis, with the deformity characteristic of rickets.

44. Cast of an extremely deformed Female Pelvis, the characters of which resemble those usually produced by mollities ossium, and illustrated by the following specimens. The woman, however, never suffered from that disease, but had rickets in infancy. The case is described by Professor Naegele, in his work on the "Obliquely Contracted Pelvis."

Presented by Dr. Rigby.

- 45 to 49. A series of five Casts of Female Pelves, deformed in consequence of mollities ossium. They all show the peculiarly beaked form of the symphysis pubis, and the extreme concavity of the ilia.

50. Cast of a Malformed Pelvis, in which the alæ of the sacrum are absent, and the sacrum itself is ankylosed to the ossa innominata on either side.

From an apparently well-formed young woman, on whom the Cæsarian operation was performed in her first labour. The case is described by Dr. Kirchoffer in the "Neue Zeitschrift für Geburtskunde."

Presented by Dr. West.

51. Pelvis, of which the greater part was occupied by a large Tumour. The woman was delivered by embryotomy on several previous occasions. On the last occasion, the uterus ruptured during the operation, and she died.

Presented by Dr. Sheekleton, by whom the case is described in the "Dublin Quarterly Journal of Medical Science."

52. Cast of a Knee, with a great enlargement of the bursa over the patella and its ligament.

53. Cast of a Knee, with a similar but less uniform enlargement of the bursa, producing a bilobed swelling over all the front of the joint.
54. Cast of a Woman's Shoulder, with a large Swelling which appeared to be due to accumulation of fluid in the bursa under the deltoid muscle. The swelling is prominent over all the articulation, but especially in front of, and behind, the deltoid.
55. Cast of a Fore-arm and Hand, with a Swelling produced by accumulation of fluid in the synovial sheaths of the flexor tendons of the fingers. The irregularity of the swelling was due to the resistance of the annular ligament and the palmar fascia, under which the distended sheaths were placed.
56. Cast of a Foot, deformed with eversion and flatness of the sole : a slight degree of Talipes Valgus.
- 57, 58. Casts of the Leg and Foot of a Child four years old. No. 57 shows the deformity named Talipes equinus, which had, in this case, existed for two years. No. 58 shows the restored shape of the parts a month after subcutaneous division of the Tendo Achillis, and other appropriate treatment.

Presented by Joseph W. Square, Esq.

- 59, 60. Casts of the Leg and Foot of an Adult. No. 59 shows an extreme degree of the deformity named Talipes Equino-Varus. The heel is raised ; the sole of the foot is turned directly inwards ; its arch is very short and deep, and parts of its outer margin are covered with a large bursa, where it rested on the ground. No. 60 shows the restored shape of the foot after the treatment, which included subcutaneous division of the tendons of the gastrocnemius, tibialis posticus, and flexor longus digitorum, muscles, and the plantar fascia.
- 61, 62. Similar Casts of a case of Talipes Equino-Varus, before and after treatment including subcutaneous division of the tendons of

the gastrocnemius and tibialis posticus muscles, and of the plantar fascia.

The patient was a girl twelve years old. After the restoration of the shape of the foot, the whole limb became larger.

63. Cast of a similar case of Talipes Varus in an Adult.

64. Cast of the Head of James Cardinal, a man who was affected with hydrocephalus from his infancy, and whose case is described by Dr. Bright in the "Medical Reports." The head measures thirty-four inches and a half in circumference.

Presented by Thomas Wormald, Esq.

65. Cast of a Head, at the back of which, and surpassing it in size, is a Tumour, which appeared to originate in the dura mater, and was composed of medullary substance.

Presented by Joseph Hodgson, Esq.

66. Model of a Hernia Cerebri, or protrusion of the brain after fracture of the skull.

67. Cast of part of a Boy's Forehead, in whom, after fracture of the skull, the brain protruded. The surface, however, healed over perfectly, and he lived in good health for many years after the injury.

Presented by J. S. Hichens, Esq.

68. Cast of a Lower Extremity, enormously enlarged by Elephantiasis.

69. Cast of a Leg and Foot. The back and sides of the foot are greatly enlarged, with a change of structure in the subcutaneous tissue, which, probably, resembled that of elephantiasis.

Presented by Page N. Scott, Esq.

70. Models of Arms, in which the skin is affected in an extreme degree with Impetigo (Porrigo favosa ; Bateman). In one arm

the crusts are raised in thick heaps ; in the other, the diseased skin is represented as exposed after their removal.

71. Model of a Great Toe, with separation of the nail, ulceration of its matrix, and inflammation of the adjacent skin. The name ' Onychia maligna ' has been given to this disease.

72. Model of a large, deep, cancerous ulcer of the integuments below and in front of the ear of a man who had been a chimney-sweeper.

73. Cast of a Heart, with an Aorta, the arch of which is greatly dilated. An aneurism, arising from the anterior part of the dilatation, has protruded through the ribs and sternum.

Presented by D. Fox, Esq.

74. Cast of a Neck, with a swelling produced by aneurism of the lower part of the left common carotid artery.

75. Cast of part of a Man's Trunk. In consequence, apparently, of obstruction of the right jugular and subclavian veins, the superficial veins upon the right side of the front of the chest and abdomen were very large and tortuous. Through them the blood was carried from the right upper extremity, and the right side of the head and face, towards the inferior vena cava.

76. Model of part of a Leg, with an Ulcer of the Integuments associated with a varicose condition of the veins.

77. Model of a Leg, in which extensive sloughing took place after ligature of the femoral artery. The ligature was applied in a case of aneurism, following a wound by which it is probable that the femoral vein, as well as the artery, was injured.

78. Model of the Stomach and Duodenum of a person poisoned with sulphuric acid.

79. Cast of an Inguinal Hernia in a Lad.

Presented by George Macilwain, Esq.

80. Cast of an Inguinal Hernia in a Man.
81. Cast of a very large Inguinal Hernia in a Man.  
Presented by George Macilwain, Esq.
82. Cast of a large Inguinal Hernia in a Man. The irregularities of the surface of the swelling appeared to be connected with thinning and partial absorption of the hernial sac.
83. Cast of two Inguinal Herniæ in a Male. That on the right side contained omentum, which could be easily returned; that on the left side contained part of the transverse arch of the colon, with omentum adherent to the lower portion of the sac.
84. Cast of an Inguinal Hernia in a Woman. The parts are preserved in the Pathological Series 17, No. 24.
85. Cast of a large Inguinal Hernia in a Woman.
86. Cast of an Inguinal Hernia in a Girl.
87. Cast of a very large Inguinal Hernia in a Woman. The swelling presented two chief portions, one of which was in the groin, the other in the scrotum.  
Presented, with the two preceding casts, by George Macilwain, Esq.
88. Cast of two Inguinal Herniæ in a Woman. That on the right side occupied only the groin; that on the left descended into the labium.
89. Cast of a Femoral Hernia in a Man.
90. Cast of a Femoral Hernia in a Man.
91. Cast of a Femoral Hernia in a Man.
92. Cast of two Femoral Herniæ in a Man; both are alike in size and shape.  
Presented, with the two preceding casts, by George Macilwain, Esq.
93. Cast of a Femoral Hernia in a Woman.



94. Cast of a Femoral Hernia in a Woman.

95. Cast of a very large Femoral Hernia in a Woman. It covered the front, and extended even beyond the outer border, of the upper part of the thigh.

Presented by George Macilwain, Esq.

96. Cast of a large Umbilical Hernia in a Woman.

97. Cast of a Hernia, which protruded through the inferior aperture of a Woman's pelvis into the lower part of her labium.

98. Cast of a Liver, contracted and nodular with cirrhosis.

99. Cast of a Liver in which a rapid growth of melanotic tumours took place. The only other part affected was a series of iliac lymphatic glands preserved in the Pathological Series, 21, No. 5. Catal. Vol. i. p. 350.

100. Cast of a Face, with a swelling produced by inflammation of the parotid, and suppuration in its interlobular tissue. The patient had typhoid fever.

101. Cast of a Face, with a molar tooth projecting through the integuments covering the left angle of the lower jaw.

Presented by J. C. Clendon, Esq.

102. Cast of an Hydrocele, in which the tunica vaginalis yielded so unequally that the swelling imitated that of an inguinal hernia.

Presented by George Macilwain, Esq.

103. Cast of a double Hydrocele. The two sacs contained together seventy-six ounces of fluid.

Presented by Thomas Wormald, Esq.

104. Cast of an Uterus which had been long inverted. It was found in a body, in a dissecting-room, by Professor Mackenzie of Glasgow, by whom the specimen was preserved.

105. Cast of the Mouth and inverted portion of the Uterus in the specimen just referred to.

These and the four following casts were presented by J. G. Crosse, Esq., and illustrate specimens described and represented by him in his "Essay on Inversio Uteri."

106. Cast of an Inverted Uterus, occurring after an abortion at the end of four months of gestation.

107. Cast of a completely Inverted Uterus, taken one month after delivery, and immediately before its removal by ligature.

108. Cast of a Specimen, which was long considered to be an inverted uterus, but which on dissection proved to be "a fibrous tumour, originating just within the cervix uteri, obliterating the os uteri in its gradual progress, and at length depending in the vagina . . . and causing atrophy of the uterus." (Crosse, l. c., Part II., p. 149, and Pl. 13, 14.)

109. Cast of the Tumour in the specimen just referred to.

110. Model of the Abdomen of a Woman, containing a foetus which passed into it through a rupture of the wall of the uterus, during labour.

Presented by Dr. Conquest.

111. Cast of the upper extremity and side of the Chest of the Patient from whom the great tumour was taken which is in the Pathological Series 35. 10, Catal. Vol. i. p. 442.

112. Model of part of a Tumour, probably composed of fibro-cellular and adipose tissue, which was removed from the upper and inner part of the thigh of a young woman.

113. Model of a large medullary or soft cancerous Tumour, situated in the lower part of the neck, and covering parts of the shoulder and chest.

114. Cast of a large medullary Tumour in the Groin. The testicles had not descended into the scrotum.

Presented by John Lawrence, Esq. The case is in the Case-Book, No. 97, p. 56.

115. Cast of an exactly similar Tumour in the Groin, which subsided on the discharge of a large quantity of pus through an ulcerated opening in the skin over it. The testicle on this side had not passed into the scrotum.

The case is in the Case-Book, No. 96, p. 55.

116. Model of an ulcerated and exuberant Cancer on the front wall of an Abdomen.

117. Cast of a portion of the Abdomen and Thigh of a Man in whom melanotic tumours existed by the side of the external iliac and femoral vessels, and projected in swellings that had the external characters of herniæ.

118. Cast of a Calculus expelled from the Urinary Bladder of a Girl, fourteen years old, after repeated dilatations of the urethra with sponge-tents. From its size and shape it may be supposed to have nearly filled the bladder.

Presented by George Witt, Esq.

119. Cast of a Calculus removed from a Man's Bladder. From its shape it may be supposed to be formed by the union of two calculi.

120. Cast of a Calculus from the Bladder of a Boy.

Presented by Richard Smith, Esq.

121. Cast of a Calculus, weighing fourteen ounces and two drachms, which was extracted from a Man's Bladder by Mr. Charles Mayo. The case is described in the "Medico-Chirurgical Transactions," vol. xi. p. 54.

122. Cast of a Calculus, nearly as large as the preceding, removed from a Man's Bladder by Mr. George Bell.

123. Cast of a Calculus, extracted, after dilatation of the urethra, from the bladder of a Girl, seventeen years old.
124. Cast of a Calculus, expelled through the urethra of a Lady, without previous dilatation. In its least diameters it measures an inch, and an inch and a quarter ; in length it measures two inches.

Presented, with the preceding, by F. F. Giraud, Esq.

125. Cast of a Calculus, extracted from the bladder of a Man, forty-two years old, by Mr. John Lawrence.
126. Casts of Calculi, naturally expelled from the bladder of a Woman, fifty years old.
127. Cast of a Calculus, removed from a Man's bladder by Mr. Cheselden.

The original is in the Museum of the Royal College of Surgeons.

128. Cast of a large Calculus, removed from the bladder of a Horse by Mr. Wm. Field. The horse completely recovered.
- 129, 130. Casts of a Man's Hands, deformed with masses of gouty deposit (chalk-stones), about nearly all the articulations of the fingers. All the fingers also are directed towards the ulnar margin of the hand.

Presented by Owen Evans, Esq.

131. Cast of part of a Foot, which remained after amputation of nearly the whole of the tarsus and metatarsus on account of injury.

Presented by C. A. Key, Esq.

132. Cast of part of a Hand, which remained after amputation of all the fingers and of their metacarpal bones near their carpal ends. The amputation was performed on account of injury of the hand.
133. Cast of a Leg, and of the part of a Foot which remained

after amputation through the tarsus on account of injury. The tarsal bones remaining in the stump were the os calcis, astragalus, os naviculare, and, probably, the os cuboides.

134. Cast of a Leg, after amputation just above the ankle.

135. Cast of a Leg, after amputation at the ankle-joint.

Presented, with the preceding, by W. J. Wilson, Esq.

136. Cast of part of the Face of a Woman, in whom a new nose was made with a portion of skin from the forehead.

The operation was performed by Mr. Vincent.

137. Cast of the Foot of an Adult Chinese Woman.

Presented by Edward Furley, Esq.

138. Cast of the Foot of a Horse, seven years old, that was never shod.

139. Cast of the Foot of a Horse, four years old, that had been shod for three months.

140. Cast of the Foot of a Horse, twelve years old, that had been shod for nine years.

141. Cast of the Foot of a Horse, fourteen years old, that had been shod for many years.

142 to 147. Casts of the Heads of notorious Murderers:—142, Thurtell; 143, Bishop; 144, Williams; 145, Eliza Ross; 146, Greenacre; 147, Rush.



## DRAWINGS.

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Diseases of Bones and Joints, 1 to 6.

Injuries of Bones and Joints, 7 to 17.

Injuries and diseases of the Brain and its membranes, 18 to 40.

„ „ Spinal Cord, 41 to 44.

„ „ Eye, 45, 46.

„ „ Skin, 47 to 69.

„ „ Organs of Circulation, 70 to 78.

„ „ Lungs, 79 to 89.

„ „ Stomach, 90 to 97.

„ „ Intestines, 98 to 106.

„ „ Liver, 107 to 110.

„ „ Pancreas, Lymphatics, Spleen, &c., 111 to 115.

„ „ Mouth, Tongue, and Larynx, 116 to 121.

„ „ Kidneys, 122 to 128.

„ „ Male Organs of Generation, 129 to 139 A.

Syphilis, in or near the Generative Organs, 140 to 144.

Diseases of the Female Generative Organs, 145 to 147.

Tumours, 148 to 189.

Calculi, 190, 191.

Congenital Malformations, &c., 192 to 200.

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All the following Drawings, to which no name is attached, were executed by Mr. William Alfred Delamotte, Librarian. Their arrangement corresponds with that of the Pathological Series of Specimens described in the first volume.

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1. Diffuse Suppuration in the Medullary Tissue of the stump of a femur. Phlebitis also existed.
2. Necrosis of part of the middle Laminæ of the anterior wall of a Tibia. The specimen is described in the MS. Appendix to Vol. i.

3. Necrosis of a portion of the anterior wall of a Tibia; the sequestrum exposed through an ulcer in the integuments (W. H. Clift, Esq.).
4. Acute inflammation of the Synovial Membrane of a Knee-joint, from a patient who died with pericarditis (A. M. McWhinnie, Esq.).
5. Acute Rheumatic Inflammation of the Hip-joint, especially of its synovial membrane (A. M. McWhinnie, Esq.).
6. 'Pulpy disease' of the Synovial Membrane of a Knee-joint; chronic inflammation, with pale brownish-red congestion, and œdematous thickening.
7. Fracture of a Tibia, five weeks after the accident. Plates of new bone are formed in and beneath the periosteum, adjacent to the plane of the fracture, and in the new tissue in the angles at which the portions of bone overlapped (H. B. Dobell, Esq.).
8. Section of the same specimen; it is described in the MS. Appendix to Vol. i. (H. B. Dobell, Esq.)
9. Ununited fracture of an Humerus, six months after the accident; the ends of the bone covered with granulations.
10. Fractures of the Femora, united with deformity. They were produced by very slight forces, in a lad suffering with extreme general atrophy (H. B. Dobell, Esq.).
- 11 to 17. A series of sketches of a specimen in which it is probable that an accidental injury had broken off the arch, with the spinous process, and inferior articular processes, of one of the lumbar vertebræ. The separated portion remained moveably connected with the rest of the vertebra.

Presented by John Jessie, Esq. From a specimen in the Museum of the Royal College of Surgeons, Pathological Series, No. 983.

18. Old dislocation of an Humerus; its head resting on the inner side of the coracoid process. The specimen is in Series 3. No. 112: Vol. i. p. 142. A cast of the same is No. 19.

19. Purulent infiltration of part of a Pia Mater.
20. Sloughing of a portion of a Brain, eleven days after a wound, and five days after ligature, of a common carotid artery. The specimen is in Series 13. No. 116: Vol. i. p. 279. The case is described by Mr. Vincent in the *Medico-Chirurgical Transactions*, Vol. xxix. p. 38.
21. Anæmia of a Brain, with hemorrhage in the arachnoid sac, in a case of purpura.
22. Partial softening of a Cerebrum with small effusions of blood.
23. Portion of Brain, with loose vascular tissue filling up a space from which a large portion was lost in hernia cerebri. The patient died thirty years after the injury.
24. Abscess in a Cerebrum; the green colour of the granular internal surface of the abscess is well marked.
- 26, 27. Brains of two Rabbits which, after death, were suspended so that the blood might gravitate in the one from, in the other towards, the head. The brain and its membranes, in the former, are pale, showing scarcely a trace of blood; those in the latter have their blood-vessels over-filled.

These and the following sketches were made from Rabbits on which some of the experiments were performed which are recorded by Dr. Burrows, in his *Essay on the Disorders of the Cerebral Circulation*.
- 28, 29. Brains of two Rabbits, of which one was killed by hemorrhage, the other by strangulation. The contrast in the respective states of their blood-vessels is nearly as marked as in the preceding.
- 30, 31. Similar sketches of the Brains of two Rabbits, of which, after death by apnœa, one was suspended with the head upwards, and the other was laid horizontally. The contrast is similar to that shown in 26, 27, but less marked.

- 32, 33. Brains of two Rabbits which, after death by drowning, were placed like the preceding.
34. Cerebral Apoplexy, with ecchymosis, softening, and discoloration of the adjacent part of the brain.
35. Apoplexy, in which blood effused in the optic thalamus appeared to have subsequently escaped into the lateral ventricle through a small round aperture.
36. Cerebral Apoplexy; effusion of five ounces of blood from rupture of a small aneurism of a middle cerebral artery. The specimens are in the Pathological Series 6. Nos. 67, 68: Vol. i. p. 206.
37. Large sloughing Abscess of the Brain after compound fracture of the skull.
38. Tumour of uncertain nature, in a Cerebrum.
39. Tumour, probably of fibro-plastic structure, attached to the cerebellar surface of a petrous bone, and pressing the cerebellum (H. B. Dobell, Esq.). From a specimen described in the MS. Appendix to Vol. i.
40. Dura Mater, with a thin layer of blood-clot on its internal surface (J. G. Shepherd, Esq.).
41. Effusion of Lymph beneath the arachnoid membrane covering the pons, medulla oblongata, and spinal cord, of a Child that died after severe and almost constant opisthotonos.
42. Effusion of Lymph over a Pons.
43. Apoplexy of the membranes of a Spinal Cord, with disks of substance like cartilage on the arachnoid. The preparation is in the Pathological Series 7. No. 9: Vol. i. p. 211.
44. A Spinal Cord crushed in a fracture and dislocation of the spine (W. J. Bayntin, Esq.).

45. A small Tumour, growing apparently beneath the conjunctiva, and bearing three hairs, like eye-lashes, on its surface (A. M. McWhinnie, Esq.).
46. The Eye of an Ox, with a growth of coarse warty Skin extending over part of the cornea, and bearing tufts of hair (W. J. Bayntin, Esq.).
47. Chronic Ulcers of the Integuments of a Leg, granulating and healing.
48. Ulcer of the Back, of ten years' duration, which resisted all means of remedy. After complete excision, healing was nearly completed, when similar ulceration again commenced, and rapidly extended.

The specimen is described in the MS. Appendix to Vol. i.
49. Syphilitic Rupia, with Crusts, on an Arm.
50. Lepra of an Arm, of many months' duration, in an old Man.
- 51, 52, 53. Pemphigus of a Fore-hand and Arm.
54. Purulent and Bloody Discharge from the Nostrils, and pustules with inflamed bases on the face ; probably glanders.
- 54 A. Ichthyosis simplex, in a Lunatic forty years old, in whom the disease had existed since childhood. Portions of the skin are in the Pathological Series 11. Nos. 28, 29 : Vol. i. p. 229.
55. Purpura Hemorrhagica.
56. Purpura Hemorrhagica ; minute and diffused ecchymotic patches on the leg.
57. Purpura Hemorrhagica, with very minute effusions of blood.
58. Scurvy ; from a patient on board the ' Dreadnought ' Hospital-ship.



- 59 to 65. A Series of Sketches of the effects of Hospital Gangrene ; from cases which occurred in St. Bartholomew's Hospital, in 1846. An account of the cases is recorded by Mr. Holmes Coote in the "Lancet," October and November, 1847.
- 66, 67. Extensive Cheloid growths in the Cicatrices following scalds of a Leg and Foot. After amputation of the leg, the patient completely recovered.
68. A Girl's Hand, enlarged by a kind of solid oedema after a burn.
69. A peculiar form of Sloughing and Ulceration of the Integuments of a Leg ; in a strumous patient (H. B. Dobell, Esq.).
70. Heart of a Woman, twenty-five years old, who died with diabetes and phthisis. It weighed five ounces and one drachm, and measured seven inches and three-quarters in its greatest transverse circumference (W. J. Bayntin, Esq.).
71. Purpurous Effusions on the Surface of a Heart.
72. Acute hemorrhagic Pericarditis ; the heart covered with reticulated, vascular, and blood-stained lymph.
73. Purulent Infiltration, or, perhaps, Capillary Phlebitis, in a portion of the Walls of a Left Ventricle.
74. Acute Rheumatic Inflammation, with vascularity and swelling, of Aortic Valves.
75. Congestion of the Skin of the Face and Arms, from obstruction of the circulation by disease, and, perhaps, malformation of the heart.
76. Medullary Cancerous Tumour, extending from the endocardium into a right ventricle. The specimen is described in the MS. Appendix to the first volume ; the case is related by Dr. Ormerod in the "Medico-Chirurgical Transactions," Vol. xxx. p. 39.

77. Acephalocyst Hydatids in the wall of a Right Ventricle near the apex of a Heart (W. J. Bayntin, Esq.). From the specimen in the Pathological Series 12. No. 40: Vol. i. p. 239.
78. Tortuous and dilated Subcutaneous Veins, in the front of the trunk of a Man, in whom it was believed that the vena cava superior, or one of the venæ innominatæ, was obliterated.
79. Purulent Infiltration of the lower Lobe of a Lung, with old clots in branches of the pulmonary artery: congestion of the upper lobe, with circumscribed effusion of blood.
80. Inflammation of an old Tuberculous Cavity in the upper part of a Lung.
81. Soft Cancerous Infiltration of a Lung.
82. Gangrene of a large portion of a Lung.
83. Diffused and spotted Pulmonary Apoplexy in a Tuberculous Lung. It was connected with profuse hæmoptysis.
84. Circumscribed and compact Pulmonary Apoplexy, connected with disease of the left side of a Heart (J. L. Bailey).
85. Empyema, with acute Inflammation of the False Membrane covering both surfaces of the Pleura.
- 86, 87. Clots, partially organized and adherent, in branches of Pulmonary Arteries. The specimens are in the Pathological Series 14. Nos. 48, 49: Vol. i. p. 290. No. 86 is engraved in the "Medico Chirurgical Transactions," Vol. xxvii. pl. iii. fig. 3.
88. Spotted Pulmonary Apoplexy.
89. Pulmonary Apoplexy in an Emphysematous Lung. Repeated hemorrhages into the trachea occurred from an aneurism of the aorta. Specimens are in the Pathological Series 14. No. 55: Vol. i. p. 291.

90. Stomach, after poisoning with concentrated solution of impure carbonate of potash (pearl-ash). Death occurred in thirty hours (J. Paget).
91. Stomach, after rapid poisoning with oxalic acid.
92. Œsophagus and Stomach, after poisoning, in fifteen hours, with nitric acid. From a specimen described in the MS. Appendix to Vol. i.
93. Congestion of the lower part of an Œsophagus, with striped blackening of blood: superficial ulcers in the cardiac portion of the stomach, with blackened effusions of blood (hemorrhagic erosions).
94. Partial separation of a Slough of the Mucous Membrane of a Stomach, ten days after poisoning with sulphuric acid. From the specimen in the Pathological Series 15. No. 27: Vol. i. p. 299.
95. Spontaneous Digestion of a Stomach after death: large portions of the whole thickness of its walls destroyed.
96. Intense Congestion of the Mucous Membrane of a Stomach; not connected with poison or any apparent disease of the organ.
97. Hard Cancer and contraction of the submucous Tissue of a Stomach, with hypertrophy of the muscular coat.
98. Veins of a Small Intestine, filled with fluid like chyle; from a specimen in the Physiological Series 12, No. 15. (W. H. Clift, Esq.)
99. Small Tuberculous Deposits beneath the mucous membrane of an Ileum; some softened, some ulcerated.
100. Small Intestine, with its mucous membrane highly vascular and ulcerated in transverse stripes.

101. Chronic dysenteric Ulceration, with blackening, of the mucous membrane of a Cœcum (J. Paget).
102. Intense congestion of part of an Ileum, with superficial sloughing in the situation of Peyer's patches : from a case of Typhus fever.
- 103, 104. Similar changes in a Colon, but with darker and more livid congestion.
- 104 A. A Peyer's Patch, extremely enlarged and partially ulcerated : from a case of Typhus fever.
105. Ileum, with ulceration of some of Peyer's Patches, and subsequent hemorrhage from them, blackening the ulcerated surfaces.
106. Ileum, with prominent solitary glands : from a case of Asiatic cholera.
107. Section of a Liver, enlarged, indurated, brawny, and pale yellowish-brown, with fatty degeneration.
108. Liver, with a Cyst containing Acephalocyst Hydatids ; the cyst-walls thickened and contracted.
109. Liver, with purulent deposits, and acute inflammation and supuration of the branches of the Vena Portæ.
110. Liver, exceedingly enlarged by a rapid growth of melanotic Tumours in it. See Cast, No. 99 ; and No. 5 in the Pathological Series 21 : Vol. i. p. 350.
111. Pancreas, with numerous Tuberculous Deposits.
- 111 A. Lumbar lymphatic Glands, from a middle-aged Man. Like all the lymphatic glands examined, they were enlarged and more than naturally vascular : in some instances, they contained a soft yellow deposit (W. J. Bayntin, Esq.).

112. Spleen, with abundant diffuse Tuberculous Deposits. From a specimen described in the MS. Appendix to Vol. i.
113. Spleen, with numerous small circumscribed Tuberculous Deposits, many of which are softened at their centres.  
Presented by S. G. Lawrance, Esq.
114. Portion of Spleen, greatly enlarged, and in one part affected with capillary phlebitis.
115. Renal Capsule, containing, apparently, Tuberculous Deposits. From a specimen in the Pathological Series 22. No. 17: Vol. i. p. 354.
116. A growth, apparently of a medullary cancerous nature, on a Tongue.
117. The same; the growth being nearly detached, and the cervical lymphatic Glands enlarged. The growth is in the Pathological Series 23. No. 27: Vol. i. p. 359.  
Presented, with the preceding, by Robert Ceely, Esq.
118. Section of a Boy's Head, with a Tumour, apparently fibro-cellular, in the soft palate.
119. Larynx, acutely inflamed, with effusion of lymph and puriform fluid in its submucous tissue.
120. Larynx, acutely inflamed, with circumscribed effusions of pus in its submucous tissue. The disease was connected with deep-seated inflammation in the fore-arm.
121. Bulb-shaped Tumour, suspended from the mucous membrane of the Pharynx, by the side of the epiglottis and right arytenoid cartilage. From a specimen in Series 24. No. 17: Vol. i. p. 364.
122. Kidneys, acutely inflamed, and with minute purulent Deposits in their substance; after a burn.



123. Kidney, enlarged, scarred, granulated, and with minute yellowish Deposits.
124. Kidney, similarly diseased, but more contracted and more coarsely granular (S. H. Swayne, Esq.).
125. Anæmic Kidney, from a Woman who died with intestinal hemorrhage during purpura.
126. Kidney, with extreme atrophy and granular degeneration.
127. Kidney, purpurous and bile-stained, from a Woman who had jaundice, purpura, and hemorrhage from the intestines.
128. Kidney, with extensive and partially softened Tuberculous Deposits.
129. Medullary Cancer in a Testicle, and in the Tissues round the Tunica Vaginalis and Spermatic Cord.
130. Chronic Enlargement of a Testicle, with deposit of yellow soft substance (H. B. Dobell, Esq.).
131. Chimney-Sweeper's Cancer of a Scrotum: a small, discoid, elevated, vascular, and warty growth.
132. Similar disease: a larger Wart, covered with thick, dry, black scab (H. B. Dobell, Esq.).
133. Similar disease: in part warty, in part scabbed, in part deeply and irregularly ulcerated.
134. Large Cancerous Ulcer of a Scrotum, not connected with Soot (H. B. Dobell, Esq.).
135. Dilatation of the middle of the prostatic portion of an Urethra.
136. Stricture of an Urethra; dilatations of the prostatic ducts, some of which contained calculi (A. M. McWhinnie, Esq.).

137. Urethra, with two annular Strictures of thirty years' duration.
138. Urethra, with a Stricture an inch in length in the bulbous and membranous parts.
139. Urethra, with Strictures and penetrating Ulceration.
- 139 A. Cancer of the Corpus Spongiosum Urethræ.
140. A Syphilitic Bubo, with pale coarsely granulating base and margins.
141. Buboës.
142. White superficially sloughing Sore on the Glans of an old Man.
- 143, 144. Secondary Syphilitic Ulcer (Creeping Bubo) in the hollow of a Thigh: in 143, progressive; in 144, partially healed (H. B. Dobell, Esq.).
145. Polypus growing from the upper part of the cavity of an Uterus, and with a ligature tied around its neck. The patient died eight days after the application of the ligature.
- 145 A. Section of the same Polypus. The specimen is in the Pathological Series 32. No. 34: Vol. i. p. 425.
146. Vaginal portion of an Uterus, enlarged and indurated, and with irregular fissures of the Os. The specimen excised from the Uterus is in the Pathological Series 32. No. 17: Vol. i. p. 422.
147. Tubal Gestation, in the seventh week, from the specimen in Series 33. No. 14: Vol. i. p. 431.
148. Large Cyst, containing fluid blood, in a Boy's neck.
149. Proliferous Cysts in a Mammary Gland: the intracystic growths protruding. The specimen excised is in the Patho-

logical Series 34. No. 19 : Vol. i. p. 437. After a third return of the disease, the patient died with erysipelas. See MS. Appendix to Vol. i.

150. Sero-Cystic Tumour (Proliferous Cysts) in a Mammary gland, together with dilatation of ducts. From a specimen described in the MS. Appendix to Vol. i.
151. Cystic and Fibro-Cellular Tumour removed from beneath the gracilis and adductor longus muscles in a thigh. From a specimen described in the MS. Appendix to Vol. i.
152. Fibro-Cellular Tumour removed from beneath a tensor vaginæ femoris. One end of it is covered with a thin layer of bone ; and partitions, containing nodules of cartilage, traverse it. From a specimen described in the MS. Appendix to Vol. i.
153. Enormous Fibrous Tumour in a Girl's Neck, rapidly reproduced after partial removal.
154. Fibro-Plastic Tumour in an Upper Jaw. From a specimen described in the MS. Appendix to Vol. i.
155. Fibrous Tumour in a Breast. The specimen is in the Pathological Series 34. No. 24 : Vol. i. p. 439.
- 156, 157, 158. Three Tumours, successively removed from the subcutaneous tissue of the lumbar region of a Girl twenty-two years old. The case is described by Dr. Douglas Maclagan in the Edinburgh Medical and Surgical Journal, Vol. xlviii. ; and these drawings were made from the originals in his possession. The tumours apparently resembled simple fibrous tumours, but were probably examples of the form named 'recurring fibroid tumour.' The patient has lived seventeen years since the last operation.
- 159, 160. Great protruding 'recurring fibroid' Tumour of a Leg. In general aspect both its exterior and its section resemble a brain-like medullary tumour. The case is described by Mr.

Paget, in his Lectures on Tumours, p. 55. The specimen is preserved and is described in the MS. Appendix to Vol. i.

161. Very large softened and sloughing Cartilaginous Tumour, surrounding the upper two-thirds of a Girl's tibia. From a specimen described in the MS. Appendix to Vol. i.
162. Softened Cartilaginous Tumour of the metacarpal bone of an index-finger. In general appearance it resembled gelatiniform cancer.
163. Medullary Tumour in a Testicle, enclosing a mass of cartilage. From a specimen described in the MS. Appendix to Vol. i.
164. Enormous Cartilaginous Tumours in several of the bones of a hand. The hand was removed from a Man fifty-six years old, in whom some of the tumours had grown from birth time. The specimen is preserved and described with the preceding (Thomas Godart).
- 165, 166. A Hand, in which the metacarpal bone of the little finger was the seat of a bony tumour, and was removed by Jonathan Toogood, Esq., by whom the sketches were presented.
167. Hard, ivory-like, Osseous Tumour involving the frontal and other adjacent bones. From a specimen in the Museum of the University of Cambridge (J. L. Bailey, Esq.).
168. Tumour in a Mammary Gland, consisting partly of cysts and partly of a solid substance of doubtful nature. Similar growths existed in the axilla, and, by their exceeding increase and protrusion, proved fatal. From a specimen described in the MS. Appendix to Vol. i.
169. Large Tumour from over a Parotid Gland. It consisted, probably, in part, of cartilage: its centre is hollowed out, and contained fluid (J. L. Bailey, Esq.). The specimen is in the Museum of the University of Cambridge.

- 170, 171. A Hand, with numerous Cartilaginous Tumours in its Metacarpal Bones and Phalanges. The specimen, amputated from a Boy, is preserved and is described with the next following in the MS. Appendix to Vol. i.
172. The Metacarpal Bone of the other Hand of the same Boy. It was amputated at the same time, and contained a similar tumour.
173. Immense Mammary Glandular Tumour. A section of it is in the Pathological Series 34. No. 18: Vol. i. p. 437: the chief mass is in the Pathological Museum of the Royal College of Surgeons, No. 208.
174. Extensive ulcerated Epithelial Cancer of the Lips of an elderly Woman. The growth surrounds more than half the mouth. The drawing was made after death.
175. Extensive ulcerated and deeply infiltrated Epithelial Cancer of the Lower Lip, Gum, and Chin.
176. Large, Warty, and very vascular growth from the whole of the Lower Lip, and half the Upper Lip, of an old Man. It was probably epithelial cancer.
177. Hard Cancer of a Breast, with unusual fulness of its blood-vessels.
178. Peculiar form of superficial ulceration surrounding a Nipple, and covering an hard Cancer of the Breast.
179. Immense Medullary Tumour in the head of a Tibia. The specimen is in the Pathological Museum of the Royal College of Surgeons, No. 281 A.
180. Medullary Tumour from a Thigh: partly brain-like, partly intensely vascular, and presenting in many places effusions of blood.



181. Medullary Tumour, from among the muscles in the lumbar region (J. Paget).
182. Medullary Tumour, with a portion of the pectoral muscle that covered it. From a specimen described in the MS. Appendix to Vol. i.
183. Great Medullary Tumour between the prostate gland and rectum of a man seventy years old. It was of slow growth, and simulated the characters of simple enlargement of the gland.
184. Fibro-Plastic Tumour in a Mammary Gland. From a specimen described in the MS. Appendix to Vol. i.
185. Melanosis of the Eye-ball and Orbit. The specimen is described with the preceding.
186. Medullary and Melanotic Tumour beneath a cutaneous nævus on the abdomen. The specimen is described with the preceding.
187. Melanosis, in clustered and more distantly scattered minute tumours in the heel and leg.
188. Tumours of uncertain nature, but somewhat resembling 'Mollusciform Cancer,' in an upper arm. The patient lived several years after amputation at the shoulder-joint. Specimens are preserved in the Pathological Series 35. Nos. 58, 59: Vol. i. p. 455.
189. A Tumour, of uncertain nature, but nearly resembling the preceding, in a boy's fore-arm. It is preserved and is described in the MS. Appendix to Vol. i.
190. Large Calculus, composed principally of Lithate of Ammonia, formed on a hair-pin in the urinary bladder of a child.
191. Similar Calculus, formed on a female silver catheter, which had remained in the bladder between two and three years.

Presented by Jonathan Toogood, Esq.

192. Congenital Imperfection of a Corpus Callosum, Septum Lucidum and Fornix. The specimen is in the Series of Malformations A. 139 A., and is described at p. 209, of this volume.
193. Congenital Imperfection of a Corpus Callosum, Septum Lucidum and Fornix (J. Paget). The case is related by Mr. Mitchell Henry, in the Medico-Chirurgical Transactions, Vol. xxxi. p. 239.
194. 'Cervical Ribs,' distinct and of unusually large size, on a seventh cervical vertebra.
- Presented by Professor Clark, and drawn by him from a specimen in the Museum of the University of Cambridge.
195. A Right Kidney, situated at the brim of the Pelvis on the common iliac vessels. It received two arteries from the lower part of the abdominal aorta, and one from the left common iliac artery (W. J. Bayntin, Esq.).
196. Kidneys situated at the brim of the Pelvis, and receiving their arteries from the common iliac (A. M. McWhinnie, Esq.).
197. Portion of one of the Kidneys last mentioned, and of a firm, obscurely fibrous, greenish tumour, which was connected with it, and filled the hollow of the sacrum (Eyre de Crespigny, Esq.).
198. A Jugular Vein of great size, in the place of the Internal Jugular, passing over the omo-hyoid muscle. It received the jugulo-cephalic vein.
199. A Molar Tooth, projecting through the integuments over the angle of the jaw, in which it appeared to be firmly rooted.
- Presented by J. C. Clendon, Esq.
200. Itch-Parasites (*Acarus Scabiei* ; *Sarcoptes hominis*).

# DIAGRAMS.

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5. The same in the Human Embryo.
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418 to 451. The Complete Series of 35 Plates from William Hunter's "Anatomy of the Gravid Uterus."

452 to 490. The Complete Series of 39 Plates from Smellie's "Anatomical Tables" illustrating the Practice of Midwifery.

Presented, with the preceding, by Dr. West.

491. The three Forms of Levers, illustrated upon the Skeleton.

492 to 495. Diagrams, illustrating Laws of Light and Sound.

THE END.













